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NOTES ON GOING VALUE

AND

METHOD FOR ITS COMPUTATION

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Previous Papers by the same Author

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NOTES ON GOING VALUE AND METHODS FOR ITS COMPUTATION

JOHN W. ALVORD

Going value is a subject which has caused much trouble to many appraisers, attorneys and even courts. It is a term of comparatively recent origin, as applied to water works cases occurring, in a Supreme Court's opinion, a little more than ten years ago. It is perhaps best understood by those men who through professional opportunity are under the necessity of originating or passing upon valuations, either in appraisal boards or in proceedings in the courts. Going value is at present the source of much difficulty to those who have not given it a good deal of thought and study.

The underlying causes of this difficulty are undoubtedly due to the following reasons:

1. A lack of clear ideas as to the underlying philosophy of the method of estimating values by "*reproduction*."
2. The common supposition that "reproduction" is a simple method of valuation.
3. The prevalence of the idea that going value is a value quite separate and distinct from other forms of reproduction values.
4. Failure to give the subject of going value attentive and thorough study.
5. The inability to find available a really complete and lucid explanation of the method by which it may be determined.

This paper is therefore somewhat reluctantly submitted as an attempt at least to throw some light on the subject. Due acknowledgments should first of all be made to the many able legal and engineering minds with whom the writer has happily had the good fortune to be associated, and from whose able discussion and elucidation of the subject he has drawn much of the reasoning which is here set forth.

It is desirable, as a preliminary to any consideration of going value, to examine in some detail the underlying philosophy of

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estimating values by means of reproduction, for without such preliminary study we can hardly hope to acquire a fair understanding of going value itself.

PHILOSOPHY OF REPRODUCTION

The method of valuing a plant and property for the supply of water or other like utility, most favored by courts and appraisers, proceeds on the theory of an imaginary reduplication of the property at prevailing prices for materials and labor, less the estimated depreciation of the existing plant. This method necessarily involves as a mental process a re-creation step by step of what may be termed a *conceptual starting plant*, that being gradually built up as a mental picture by the aid of experience, local information and trained imagination, will eventually duplicate in its final form and detail the existing or going plant.

In this attempt to re-create, step by step, as a mental concept a parallel panorama of the construction of any existing plant, it is obvious that practicable working time is vital to the proper estimation of the cost. Time being always directly involved in items, such as "Interest on Investment during Construction," Cost of Administration," and indirectly involved on other items such as "Cost of Material *Delivered*," and the "Price of Machinery *set up*," "*Concrete in place*," etc, neglect of proper time assumption at every step of the way will be fatal to a full and just duplication of values.

The courts in favoring the reproduction theory have been influenced in part by the seeming simplicity of the method. It is to be doubted if this seeming simplicity exists. In practice the method logically requires many refinements some of which are quite complex. Calculation of the cost of reproducing the business and income are perhaps the most complex of its requirements. Could plants, property and business be instantaneously created by rubbing an Aladdin's lamp, cost would obviously be wonderfully lessened and, to the extent that an Aladdin's lamp is introduced into valuations, so far are such values made thereby incomplete, impractical and unjust. The theory of reproduction, if it means anything, means painstaking consideration of the time taken in each stage of the

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progress toward the completion of the structure and property, and its effect upon the resulting cost, all of which has to be mentally imaged and computed closely in accord with practical working under practical limitations by an experienced and capable mind.

A full understanding of the importance of time in valuations based on the reduplication theory will clear away some of the misunderstandings occasioned by unexpected items and will lead to a more intelligent appreciation of the reasons for and the methods of computing what have been called the intangible parts of a plant and property.

PHYSICAL VALUES

The conception of these intangible values will be made more clear if as a preliminary we follow through some of the conceptual steps in the reproduction of the physical part of a plant. Some of these steps which are more or less self-evident may be stated as follows:

1 In estimating the cost of reproducing a plant, it is obviously important to consider the reproduction as taking place in a way that is *humanly possible.* Now, it is not humanly possible to construct a plant in the past, or in one day, or by the substitution of hindsight for foresight; therefore, if we are to avoid flights of constructive fancy, we are compelled to consider the reproduction as taking place in the near future in reasonable and workable periods of time, and without special foreknowledge other than that gained from experience with similar construction and familiarity with costs in the near past. To do other than this will not be "*reproducing.*"

2. A conceptual starting plant which is in process of being estimated must be made to pass through all the preliminary phases of mental origination as well as physical construction; it must consider the time and cost necessary to devise, conceive, design, negotiate, administer and direct, as well as the labor cost of digging and building, and the duplication which we try to imagine involves the re-creation of many subordinate structures, appliances, and much machinery which will have been removed or will have ceased to exist, but which were necessary in their time and place in order to bring about that finished condition which finally appears.

3. The conceptual starting plant must of course finally precisely accord in form, dimension and extent with the existing or going plant under consideration; in other words, the estimator has before him full-sized and lifelike plans and specifications furnished by the existing or going plant. This very completeness of data often tempts even experienced estimators into a neglect of the intermediate steps by which such plants are originally evolved.

4. The conceptual or starting plant should, as a matter of fairness, deal with all difficulties known to be originally encountered in constructing the existing or going plant, notwithstanding such difficulties might now be easily modified or eliminated by a forewarned intelligence.

5. The value of the conceptual or starting plant should be computed upon such prices of labor and material as it would seem safe for a prudent man to commit himself to and for such reasonable period in the near future, as experience shows will properly be required for construction. Such period in any new construction cannot of necessity be contemplated as completed in the near past from the date of the estimate, for to consider such prices as of a period that has already passed would be taking advantage of knowledge not humanly available to the ordinary constructor. Prices in the near future, however, should of course be predicated (with good judgment) upon those of the near past, just as in any practical case of new construction.

6. Certain values are largely determined and influenced by the time assumed to be taken for construction; the following are typical examples:

1. The Preliminary Costs of Organizing and Conceiving.
2. The Interest on Investment During Construction.
3. The Administration Cost During Construction.
4. The Engineering and Supervision During Construction.
5. Delays and Contingencies During Construction.

Such items are of necessity added to the cost of the plant during construction. Some of them will in time become operating expenses, but until operating revenue is available they must be added to the invested capital.

7. The method of valuing at some present date by the repro-

duction theory will necessarily include all the appreciations in value which logically and properly ought to be credited to the existing or going plant, by reason of its age. Some of these appreciations are readily admitted, as, for instance, "Increased Value of Land" due to a city's growth, but other items quite as logical are sometimes unexpected, as, for instance, the increased cost that will be necessitated in relaying pipe under pavements.

8. If appreciations are thus made necessary in the process of duplication, it is also true that on the completion of the conceptual starting plant it must be reduced in value by the measure in which the existing or going plant has depreciated through age, wear and tear, by reason of new inventions, changes in demand, growth of ideas and other fluctuating conditions. The time element here is of vital importance.

INTANGIBLE VALUES

The above outline of some of the principles which guide a practical estimator in dealing with physical property does not exhaust this part of the subject, but is sufficient to disclose the importance of the time consideration necessarily involved, and leads up naturally to a more intelligent appreciation of the more intangible values in which the time element plays an increasingly greater and greater part. Continuing, therefore, the conceptual production of the starting plant, we come to the question of estimating the cost of reproducing the business and income of the existing plant, commonly known as the going concern value.

This leads us to these further considerations:

1. It is not to be overlooked that, while the conceptual starting plant is thus being built up step by step, the existing or going plant is earning revenues, which (less operating expenses) are, of necessity, largely if not wholly lost to the conceptual starting plant.

No condition can be imagined which is practical and humanly possible which does not result in these disadvantages to the conceptual or starting plant. The actual construction of a real duplicate or rival plant would not escape this practical result, except by the introduction of Aladdin-lamp methods of reproduction. If we ignore practical time limitations in the recovery of an income, we violate all those practical conditions under which we have properly so far endeavored to proceed. If the theory of reproduction is adopted at all, it must be logically carried out, and if logically carried out in a manner humanly possible, such losses cannot be neglected. A municipality facing the question as to whether it will be better policy to purchase a private utility company's plant, or build one of its own, faces the practical question that it *will not receive the revenues during such construction* if it decides to build instead of buy. There is no escape from this dilemma, and, as a practical proposition and as sound business policy, it can usually afford to pay for the existing plant the larger part, or even all of these net revenue losses in addition to its other costs.

2. Further, when the physical property of the starting plant is completed within the constructive time assumed, the estimate of its property value for comparatve purposes is not finished, for only then would it be humanly possible to begin the work of reproducing the business and income of the existing plant, and until this is done we have not completed our reproduction.

DEFINITION OF GOING VALUE

3. Going value may therefore be defined as the value of a created income, or, to put it in the language of the theory of reproduction, it is the *cost of reproducing a given income.*

4. Therefore, in using the theory of reproduction, it is as proper and just to estimate the cost of reproducing the income of the going plant and property as the cost to reproduce its pumps, its pipes or its structures.

5. Thoughtful consideration of going value shows that it has no existence without earnings; it is inherently derived from consideration of the efforts to create revenues. Thus, a plant may be losing money and still have a going value, for so long as it earns anything at all it has some revenue which ordinarily it would cost something to reproduce, but when a plant ceases to operate, its structural value may be said to die with its going value. As Mr. Williams has well said, they largely live and die together, but the going value is the crowning effort to complete a property, it comes into being last, and in it lies the final test of the value of the physical property.

6. Going value, unlike depreciation, has, where it exists at all, been bought largely if not wholly by cash outlay. It is not an unearned increment or a theoretical accretion from causes outside the ledger of the operating plant, except perhaps in one item, viz., opportunity to earn during duplication. After duplication is completed, going value is paid for in cash outlay to meet fixed charges and operating expenses that are not earned, and which often require expenditure to a greater extent than the going value will be worth in years to come.

7. Any estimate of the cost of the duplication of a given income (going value) is of practical necessity based upon some appreciable length of time in which to operate, recover and duplicate, just as conceptual physical construction is of necessity based upon some reasonable time in which to construct. Such time assumption for a conceptual starting plant to obtain and build up a given income must of necessity be in the future, largely after completion of the conceptual construction, for to reason otherwise would be to introduce estimating methods which are not humanly possible in actual life, and this, as I conceive it, is contrary to the reasonable intention of the theory of reproduction.

NECESSARY DATA FOR GOING VALUE

8. The necessary data and personal requirements for the fair and proper computations of the cost of reduplicating a given income, (going value) are as follows:

(*a*) An accurate statement of normal and proper income of the existing or going plant at some period near to the date of computation in order to know the income which the starting plant must begin to acquire.

(*b*) The past financial history and growth of the going plant and its business in order to determine those future earnings of the going plant to which the starting plant must attain.

(*c*) The normal and proper past operating expenses of the going plant in order to make proper comparison with the probable operating expenses of the starting plant.

(*d*) The separation of the revenues of the going plant in the past into those from public and those from private sources in order that the more prompt probable acquisition of public revenue may be duly allowed for.

(*e*) Data showing the general growth of the community and its salient industrial characteristics in order to confirm forecasts of growth of business in the near future for both starting and going plant.

(*f*) A wide experience on the part of the estimator in the art of constructing and operating plants and supplying communities with water.

(*g*) The ability on the part of the estimator from similar experiences to carefully analyze the practical effects of a conceptual starting plant in any given community, and a comparison of its results through a series of near future years with the probable results of the operation of the existing or going plant through the same period, and here it may be properly said that in no other part of the conceptual process of reproduction is it more important that the estimator be free from all personal bias, and have that intellectual independence which enables him to value fairness above all other considerations.

9. Given the above data and conditions, the cost of the reproduction of the income of any existing or going plant will be the difference between the net results of its operation and the net results of a well-conducted starting plant, through the time necessary to enable the starting plant to be completed and attain an income equal to that of the going plant.

10. As the differences between the actual going plant and the conceptual starting plant are necessarily all in near future years, the present worth should be found in each instance.

In valuing going plants on the theory of reproduction, the addition of going value is sound in principle, but the fixing of the exact amount, resting as the data does upon assumptions in the future, is always difficult of precise determination. This difficulty is wholly attributable to the reproduction method, which requires the assumption of time for construction and duplication, of necessity projected into the future. Of this future the going value element is the farthest removed from the present time of all other items, and therefore the least definite with which to deal.

In spite of these difficulties, competent and experienced appraisers, familiar with the art of constructing and operating water plants, and having wide experience with varying conditions, have usually agreed within quite reasonable limits in computing going value.

WHAT GOING VALUE IS NOT

Having shown what going value is, it may be permissible to show what going value is *not,* as well intentioned efforts have been made by courts, appraisers and engineers, to find some short cut which would be at once easily understood and explained, and simple to compute.

Some of these proposals are as follows:

1. To predicate the cost of going value upon the cost of constructing house services. This idea arises from the theory that going value is the cost of getting the plant connected with the consumer and that the cost of getting it connected to the consumer is practically the cost of the house connection service. Obviously, this does not bear investigation for many reasons, for while the consumer is being connected, the works are being operated at a loss. Interest charges are not being met. Depreciation is beginning and is not recoverable, and in many other ways going value costs are incurred which would not appear in the computation. Moreover, it is certain the mere cost of the house service has little if anything to do with going value. In many works the house services are owned by the company and to reduplicate the works they would necessarily be included in the physical value, and to include them again as part of the going value would be quite illogical.

2. It is usual for courts and appraisers unfamiliar with the theory of going value, to attempt to estimate it as a percentage of the value of the physical property. Estimates of going value which have been made in a logical manner in about two dozen cases, produced results which are found to range all the way from $9\frac{6}{10}$ per cent to 47 per cent of the physical property. Finding this to be the case, a guess percentage of the physical value has been roughly taken as a short cut to the problem.

Now if such percentage were based upon gross revenues rather than upon physical values it might have more justification, but as a percentage of physical values it has no justification beyond the fact that, so far as we have gone, physical plants with general similarity have been followed by a general (very general) similarity of going values. Possibly even this similarity is artificial and personal to appraisers rather than really the case.

The ability of citizens of a community to obtain potable water by other means than through the public supply has, for instance, much more effect upon going value than does the cost of the physical plant. In communities where good wells abound and the soil has good filtration qualities, going value will usually cost much more to acquire than where good water is not obtainable in any alternative manner, and many plants have been failures owing to their inability to acquire sufficient going value at any reasonable cost.

The physical property has, in fact, nothing whatever to do with going value, except it be quite accidentally, that is to say, when plants happen to be similarly situated in those elements that go to make up going value.

3. An effort has been recently made to find the proportion that going value bears to the established revenue which is to be reproduced. Here we approach more reasonably the analogy required, that is, that things derived from like data may be compared in a general way, for going value is to some extent a function of revenues, but yet is in fact only the cost of reproducing a revenue. Building estimators sometimes estimate the cost of a house by its cubic content as compared with other sized houses of known cost, and with only general ideas as to interior finish. In somewhat similarly rough way going value might be deduced from amount of revenues, where plants are so similarly situated *that the conditions of reproducing revenue are alike* or even fairly so. But because plants are similarly situated with respect to amount of income, by no means assures us that they may be similarly situated and with respect to the cost of recovering such income, for while population, growth and manufacturers may be almost precisely alike in two places, yet the character of the water served, its quantity and quality, the availability of other sources, filtration, hardness and many other items may make the cost of recovery of income differ largely so that even proportions based on the comparison of revenue to going value are deceptive and illogical. Of necessity too, such comparisons must be made upon the basis of a large number of computations of proper and logical going values, and it is to be doubted if such computations exist in sufficient number to warrant the comparison as yet.

4. I need hardly to speak of "freak going values"; they are numerous. Perhaps, however, extreme cases may be cited.

One I have seen capitalizes the gross revenues of the plant at 4 per cent and adds it to the physical property along with a liberal franchise value. It is needless to say that here every value is in at least twice, and probably some values are in several times. On the other hand, it has been seriously suggested that if a given plant owning its services were theoretically stripped of its consumers over-night, the plumbing would still exist in all the houses, the people would be educated to the use of water, and the recovery of the income would be made in less than twenty-four hours by the liberal use of the telephone and extra gangs of active men with service cock keys. Could we get these two computations together on one case, obviously the judge in that case would be justified in the rather too usual custom of splitting the difference.

If going value is reasonable at all, it is reasonable because it is logical, and if logical it must be founded on data that are logical. Let us turn for a moment to the further consideration of these data, much of which has been ably discussed in appraisal boards composed of fair-minded men, sincerely anxious to ascertain the reasonable truth.

ESSENTIALS OF PROPER COMPARISON

In comparing a duplicate starting plant with an existing going plant for the purpose of estimating the cost of recovering a given income, the following premises have been pretty generally agreed upon:

1. The estimate must be arrived at by the mental concept of a parallel plant, which step by step is devised, constructed, completed, put into operation and finally acquires all of the revenues of the existing plant in due and proper order.
2. The process of constructing the starting plant and the reduplication of its income must proceed in a manner that is humanly possible through complete and reasonable periods of time.
3. The comparison does not admit of supposed rivalry or competition between the starting plant and the going plant, but, to be just, the business of the going plant is to be considered as extinguished just as fast as the starting plant is ready and able to take it on, or the business may be considered as transferred without prejudice or demur as fast as conditions permit.

4. The cost of reproducing present income and determining going value at the present time is not to be confused with a past going value, for what it *has* cost the going company for its going value in the past has no more to do with the case than the past cost of physical property has to do with its present reproduction cost.

Where going value has been acquired in the past by an operating company, moneys have, invariably, actually been expended for its acquisition. Now that past acquisition of going value will be found to have suffered its appreciations or its depreciations as the case may be, and its present value is not what it has cost, but what it has cost plus its appreciations or minus its depreciations, this result ought theoretically to approximate at least the cost of duplication.

To illustrate this, past going value may have paid largely to educate the people to the value of potable water delivered under pressure. It is held by experienced estimators that this expenditure for education has depreciated because its benefits cannot be retained by any particular company as an asset, but are lost to it individually. Consequently, we must allow that at the present time populations are used to potable water and its increased value under pressure is reasonably and generally known. Going values, therefore, often have cost more in actual expenditure than they are at present worth. A part of this depreciation in going value should be attributed to the general advance in civilization and the general increasing knowledge of the benefits of a water supply.

ACCOUNTS NECESSARILY CONSIDERED

5. In comparing the going value of an existing plant with a conceptual starting plant, there are five important accounts to be compared. They are:

1. Interest on Investment.
2. Depreciation.
3. Operating Expenses.
4. Public Income.
5. Income from the Private Consumers.

Where these accounts happen to balance, as for instance in the case of Interest on Investment after completion of the starting plant, they may be omitted for purposes of simplification.

6. *Interest on Investment* during the period assumed for the construction of the conceptual starting plant produces a balance in favor of the starting plant, and must therefore be considered, but it is usually treated as a part of the physical cost and added to capital account. It might be more logical, however, to include it in going value, in which case it makes the going value total larger and, equally, the physical property total smaller than would otherwise be the case. Present practice, however, inclines to consider it as a capital cost item and exclude it from going value.

7. Depreciation is obviously much less for the starting plant than for the going plant and in proper comparison produces a balance in favor of the starting plant.

8. Operating expenses are generally less for the starting plant than for the going plant. During the period assumed for the construction of the starting plant, the starting plant has no operating expenses, while the going plant has full operation. After the starting plant is completed, operating expenses begin and gradually reach full operation cost during the period assumed for recovery of income to normal. Operating expenses are, however, necessarily greater in the starting plant in proportion to its income, than is the case with the going plant, for the reason that administration, labor, salaries and other accounts are but little reduced by partial operation. Also the first years of operation are always necessarily expensive owing to lack of correct organization, adjustments of new construction and the merging of construction into operation.

The balance of comparison of operating expenses between the going and the starting plant is usually a credit to the starting plant in its net results.

9. *Public Income* or hydrant rentals will necessarily be a credit in full to the going plant during the assumed period the starting plant is under construction. After the completion of the starting plant it is usually assumed that this business may be and is transformed at once to the starting plant, and thereafter credited to it. Exceptions to this rule may be made in the case of very large plants taking considerable time to construct, for in such cases portions of the public revenue may be transferred at different intervals as the starting plant is able to care for them, and transferred perhaps, even prior to the full completion of construction in some cases.

10. *Private Income* or returns from the domestic consumption will necessarily be fully credited to the going plant during the period assumed for the construction of the starting plant, but after the staring plant is ready to operate, it begins to recover or absorb the income from domestic consumption as fast as people can be persuaded to connect with the plant, so that in an assumed number of years all of the domestic consumption is finally acquired, thus completing the duplication of the revenue.

In case of large plants taking some years to construct, it may be sometimes the case that water is served to limited districts before the plant as a whole is complete, and this not only may be allowed for, but there are cases where temporary pumping plants might be warranted so that the acquisition of business may be hastened. The cost of such temporary pumping plant should, however, be added to the operating expenses of the starting plant and are a drawback, only occasionally warranted.

The net credit then of the domestic revenues will be to the going plant during all of the period assumed both for construction of the starting plant and for the production of its revenue up to the final assumed year in the future when the income of the going plant is assumed to be equaled by the starting plant.

11. The period assumed for construction of the starting plant can be pretty definitely fixed from experience in similar construction and is the greatest factor in going value, involving, as it does, the inability of the starting plant to earn during that time.

RECOVERY OF REVENUE

12. The period assumed for the recovery of revenue by the starting plant after completion must be predicated upon:

(*a*) The ability of the population to obtain good water elsewhere, especially in small cities and towns.

(*b*) The incentive of the consumer in the large town by reason of his confined situation.

(*c*) The physical possibility of connecting and plumbing large populations.

(*d*) The number of large consumers that could be quickly transferred, such as manufacturers, railways and the like.

(*e*) The number of small consumers that would be only sluggishly acquired.

(*f*) The progressiveness and wealthiness of some communities *vs.* the poverty and ignorance of others.

(*g*) The incentive of the water company to begin paying its fixed charges.

The net result of all these influences in the opinion of most estimators will be to make rapid growth in the first interval of time succeeding completion followed by slower and slower acquisition until the final completion. In the first year the limiting conditions in most communities will in all probability be the physical impossibility of making all connections acquiring business, and, on the part of the taker, of doing the necessary plumbing. While the limiting conditions in the last year will be probably the sluggishness of the outlying and small consumer due either to his ability to obtain good water elsewhere, or his indifference, financial inability, or both.

The effect of the assumption of time period for the recovery of revenues is less than half as great as the assumption of time period in construction, for the reason that with public revenues promptly acquired by the starting plant on completion of its construction and the subsequent rapid acquisition of large consumers, the latter years of this period are ineffective in producing much credit to the going plant.

13. The periods usually assumed in plants costing less than $1,000,000 are for construction from one to three years and for acquisition of revenues from three to five years additional.

14. It is not assumed by experienced estimators that population are provided with plumbing and all appurtenances for utilizing water under pressure. Only general knowledge of the value of good water under pressure is conceded. Upon this point, however, there are differences of opinion.

It must be conceded, however, that if we are to proceed on the theory of reproduction, in carefully reproducing the conceptual starting plant, we cannot humanly expect to find, on its completion, consumers awaiting it with plumbing which can not have been reproduced under reasonably probable conditions.

Fairness will here naturally lead us to consider what would happen in a natural and humanly possible way, and in such case plumbing in house would naturally and inevitably await the certainty of water connection before it would have the incentive to exist.

15. In all computations assuming future credits, it is conceded by experienced estimators that they should be reduced to their present worth at going rates of discount.

DIAGRAMMATIC REPRESENTATION

To those who are accustomed to thinking by the aid of diagrams, the subject of going value may perhaps be made more clear by the one here shown depicting the typical growth in value of a water works plant, and the time element involved in reproducing the same. This diagram is not illustrative of any particular plant, but is rather a composite of many plants which have come under the writer's notice.

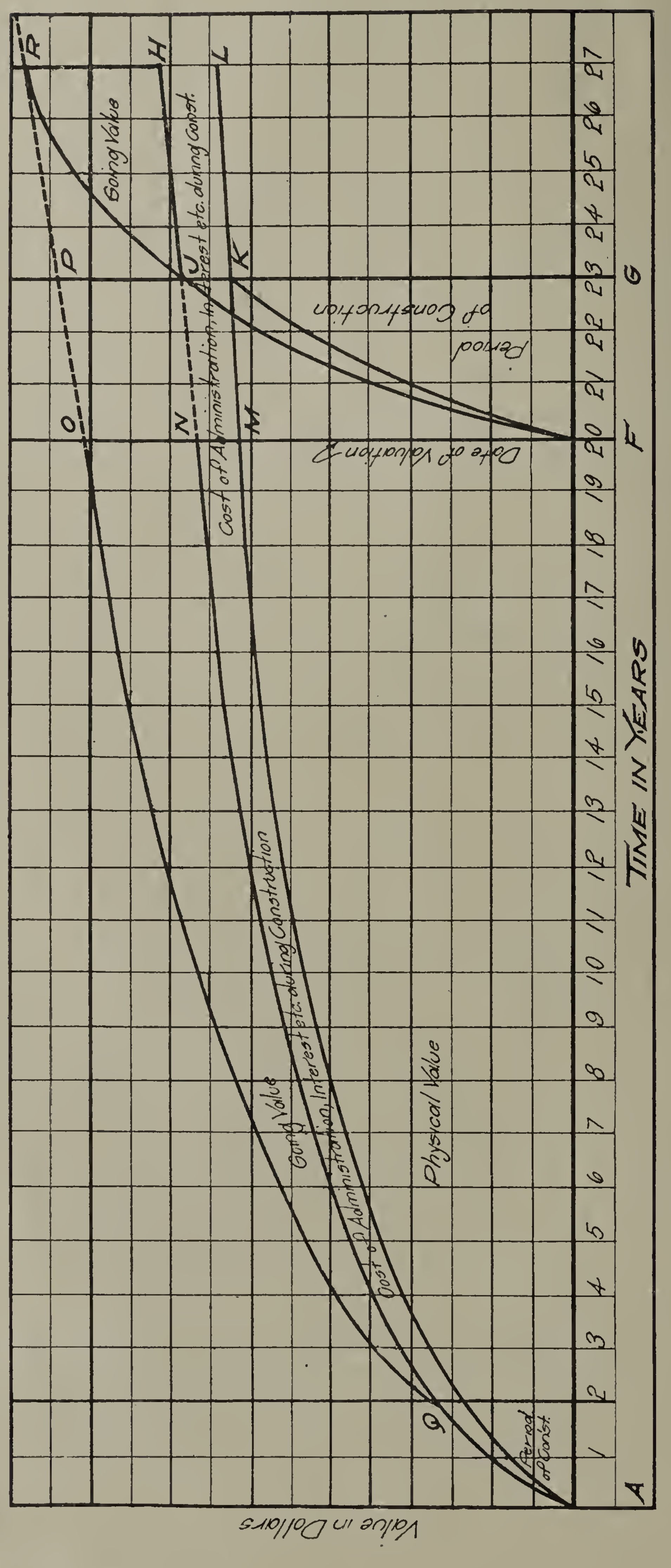
The spaces along the bottom of the diagram give the time in years which have elapsed since the original construction, and it is assumed that about the twentieth year it is desired to value the property for purposes of purchase or fixing rates.

The vertical spaces upon the diagram represent increments of value due to the cost of its construction and its going value. In the beginning of its history two years are assumed to have been necessary for construction, after which time the plant begins to acquire its going value. In the earlier years of operation the acquisition of going value is necessarily quite slow. An additional curve of growth shows, roughly, the proportionate costs of administration, interest, etc., during construction, which are added to and are a part of the physical value.

For purposes of illustration, it is assumed that in its twentieth year this plant is to be valued. The estimator thereupon proceeds to compute the construction of a conceptual duplicate plant and, as the original plant has grown in value year by year through minor additions and extensions, he is now facing the contingency that it will require perhaps three years instead of two for the actual physical replacement. This, as shown by the area *F.K.G.*, is in advance of the date of the estimate, as must be the case if the estimator is limiting himself to what is humanly possible.

During the construction the estimator computes the necessary expenses for administration, cost of interest on capital being invested, engineering expenses, etc., which may be graphically represented as added to the other construction by the area *F.J.K.*,

Diagram
Showing Typical Growth in Value of Water Works Plants
and
Method of Reproducing Same
at
Some Fixed Date



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reproducing at the end of the proper assumed construction period the value of such items as they already exist in the going plant.

The estimator then arrives at the value *G.J.* for the physical property, and it remains for him to reproduce the going value *O.M.*, existing at the date of his valuation, but in order to recover this going value we must again be cautious enough to proceed in a manner which is humanly possible, that is to say, the conceptual plant will not only have to recover this cost of reproducing the income, but at the same time, it will be hampered by the necessity in common with the going plant of recovering such growth of revenue as the near future may reasonably yield. This, of course, is not an element of its credit except as it embarrasses and delays it in acquiring the full going value *O.M.*

If the estimator further proceeds in a manner which is humanly possible, he must consider this acquisition of going value as taking place in the period following the periods of construction, which period is assumed for illustrative purposes in this case to be four years, and after having made the assumption and computations for credits to the going plant must of necessity refer them back to their present worth. This reduces his values back to the twentieth year, and completes his valuation of *F.O.* upon the diagram.

This total is a "total value" diagram and must not be confused with a "revenue diagram" which is frequently used in somewhat the same manner. In computing the cost of reproduction of revenues or going value, examples of such revenue diagrams are shown as an appendix to this paper. These are actual selected cases of going value which have been computed by boards of appraisers at different places and by different methods. As it is desirable to include among them some properties in which transfer was not accomplished, it has been thought desirable not to give the names of the plants so that the list might be as complete as possible. It will be seen that they are not always computed on the same basis. This is accounted for by the fact that some of them were of an early date when the theory of going value was not, perhaps, as fully understood as it is today, or in some cases they have been computed by boards among whom were estimators not fully familiar with this subject.

The following notes on these diagrams may be of interest:

No. 1. In this case there has been allowed a period of construction and rather long period of recovery. This was because the city was backward in growth. It will be noticed, however, how little the last few years of recovery add to the total value.

No. 2. Allows no period of construction, the city exercising an option of purchase. The period of recovery here is rapid in early part of the curve, due to large manufacturing interests, and sluggish toward the end, due to population of small financial capacity.

No. 6. Is a fairly live town in which the option of purchase was being exercised. There is therefore no construction period included and the recovery is fairly rapid. One large institution taking considerable water is the reason for the large proportion of revenues acquired the first year.

No. 7. Is an exercise of option, but long recovery, although reasonably rapid except at the latter end. A combination of local reasons, too long to be fully described here, but carefully discussed by the board, produced this result.

No. 8. Was a rate case with insufficient financial data prior to valuation to make a really competent determination of future revenue. This was a sluggish town with other opportunities for individual water supply, producing, in the judgment of the estimators, a slow probable recovery.

No. 10. A town without manufacturers and opportunity for individual water supplies. Recovery therefore slow. Past growth also small. One year for construction included.

No. 11. An interesting case of actual competition of two rival plants: one a municipal and one a private plant in the same territory. Later data than that plotted is said to show that the earnings of the new municipal plant fell off while the earnings of the private plant slightly increased, but the figures have not been obtained. This is a most interesting instance of the disaster of actual rivalry in the water works business, as neither plant was able to pay fixed charges and the municipality was finally obliged to purchase the private plant to remove competition.

No. 14. Was a Mississippi River town of rather slow recent growth, but with some manufacturers and large takers. Construction period included as transfer was not optioned. Recovery of income rapid in first three years, but a small increment of sluggish business allowed for. The long period of recovery was due to size of city and its future outlook.

No. 17. A rate case in which estimators predicated going value on fair return only, raising some interesting questions as to course which they might have pursued if revenues were below a fair return.

No. 19. A large manufacturing city with large takers. Construction period included, but local opportunity for temporary pumping plant in service prior to full completion allowed for.

INCLUSION OF PERIOD OF CONSTRUCTION

Some difference of opinion has arisen between estimators as to whether the period of construction of the starting plant should be considered in going value. This period, of course, involves the losses in revenue which the starting plant is obliged to confront, because it is unable to take upon itself the responsibility of delivering water until its physical completion. Some estimators and even one court have held that this period was not a part of going value because it did not cause money to be necessarily expended by the starting plant. They point to the fact that the original plant did not receive revenues while it was being constructed, and that if we allow interest upon the capital invested during construction to be added to the capital account we have remunerated the projectors sufficiently.

This conclusion may satisfy the conscience of the hasty investigator, but it does not meet the whole logic of the situation, as becomes apparent when we apply the test again (as we have so often done before in this paper) as to what is "*humanly possible*," and at the risk of repetition we repeat the argument against this view.

Granted that there is a going plant, and that the estimator stands at the point where he is under the necessity of making his conceptual plant fully equal to that going plant in value, can he properly ignore the fact that he must undergo a period of construction in which no revenues will be earned by the starting plant, as is done by the going plant? If he ignores this fact and assumes the starting plant to be immediately possessed of such revenues, he has rubbed an Aladdin's lamp again.

Or to illustrate this more clearly, take the case of a city contemplating the possible purchase of a Public Utility Company's works, or the alternative of building a duplicate plant of its own. Any estimates it may make for building a duplicate plant that neglected to remember that its duplicate plant would not commence acquiring revenue until after completion would unfairly represent the situation, for the city obviously would want to purchase the going plant at such price if it could, because it would at once jump into possession of its revenues, when to build one of its own (without considering at all competition) would necessitate only beginning to earn after construction was finished.

It is therefore quite certain that there is an element of going value accruing to a going plant by reason of the fact that it cannot be created instantaneously by the mere "rubbing of an Aladdin's lamp," and that usually some years of construction must necessarily elapse before revenue could be even begun to be acquired by a rival of any kind.

CONSERVATIVE ESTIMATING

It is perhaps necessary to point out that estimates of going value are very easily overworked, and that the worth of the going value liberally taken necessarily extracts in favor of the going plant all of its possible operating credits in an indeterminate future. Some allowance, therefore, should certainly be made for the uncertainty of these future assumptions. This must evidently be done by a strictly conservative estimate of going value, assuming data upon the best possible practical conditions which the starting plant may hope to meet with in the case in hand in acquiring and reproducing the income. A recovery of income by the starting plant should be assumed which is all that can be properly expected, and its time of idleness in construction should be limited whenever properly possible. All of the incentives to the starting plant to early and quickly acquire its business and pay its fixed charges and accumulate its fair return should be considered. When this view of the situation is taken, going values may be produced which will look reasonable to the estimator from both sides of the valuation, and he should satisfy his conscience in this way no matter which side he happens to be engaged upon.

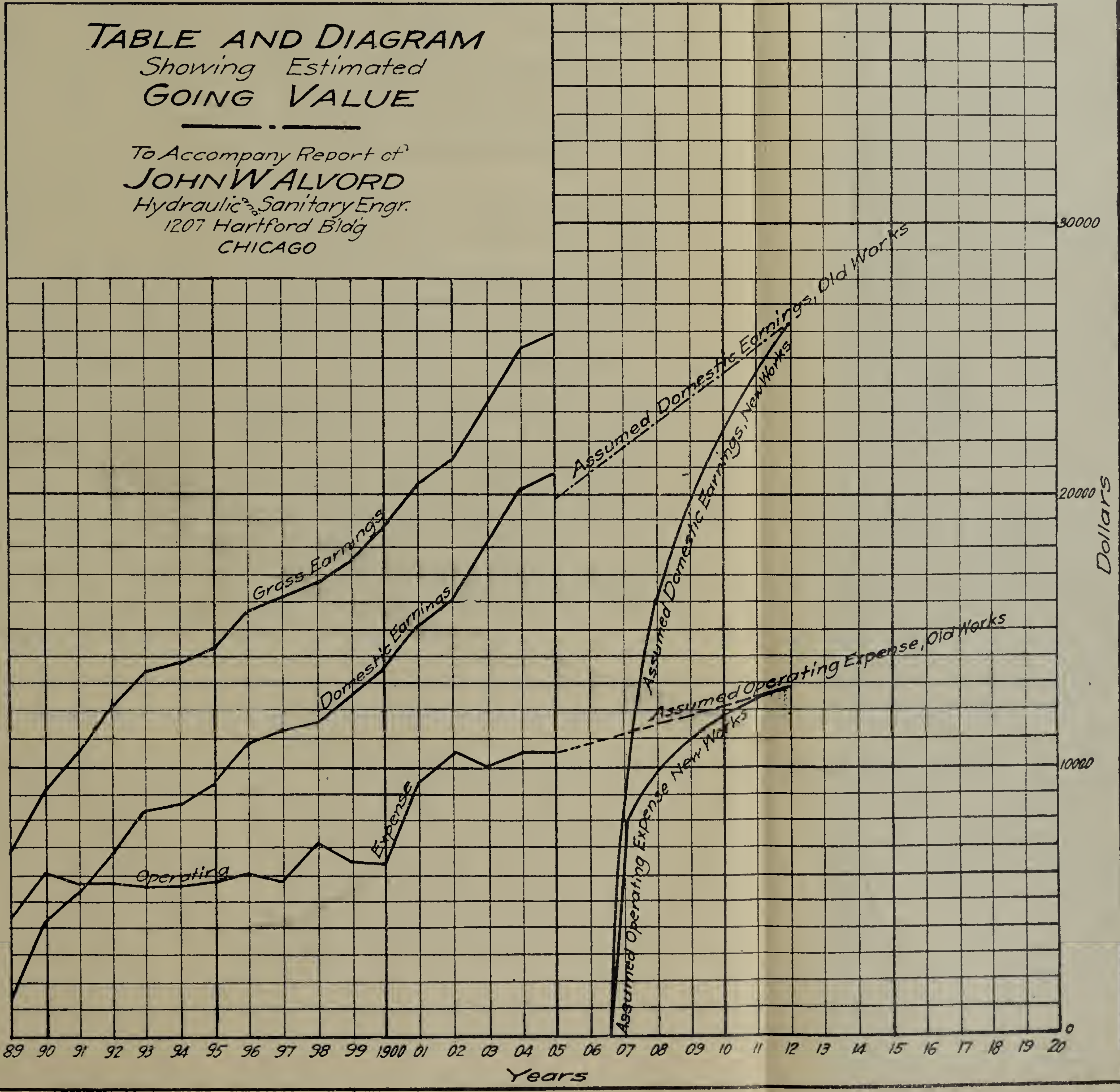
Year	OLD WORKS	NEW WORKS			Annual Going Value.	Factor	Present Worth Going Value
	Domestic Earnings	Domestic Earnings	Differense Op. Ex.	Total Credits			
1907	21800	8500	3500.	12000	9800	.952	9340
1908	22720	16000	1500	17500	5220	.907	4740
1909	23640	19500	800	20300	3340	.864	2870
1910	24560	22500	400	22900	1660	.823	1380
1911	25480	24800		24800	680	.784	530
1912	26400	26400		26400	0		0

Population 11269
Number of miles Water Mains 8½

Total Going Value #18860

TABLE AND DIAGRAM
Showing Estimated
GOING VALUE

To Accompany Report of
JOHN W ALVORD
Hydraulic and Sanitary Engr.
1207 Hartford Bldg
CHICAGO



THE OPTION OF THE CITY

It has been suggested by the writer that certain modifications may be made in going value, due to the fact that in many franchises, in the West at least, the municipality often holds an option, or right to purchase plants at an appraised valuation at given intervals of time during the life of the franchise. Such option necessarily is of value to the city holding it. The city has, by contractual relations, acquired the right to become possessed of the particular plant in question. Under these circumstances, it must be conceded that it does not have to face the possibility of building a duplicate or rival plant; that by its contractual relations it has acquired the right at once to step into possession of the plant and its revenues which it has authorized and legalized.

Under such circumstances, it is a question whether the value of this option should not be recognized in some way. The writer's idea has been to recognize it in such cases, and, under such rights, by leaving out of the computation of going value the increment of earnings which the going plant derives while the conceptual starting plant is under construction. This considerably reduces going value under such circumstances; whether this reduction in revenue is precisely the value of the option which the city holds or not is subject for discussion, but it seems to the writer that it does and is entirely logical. One or two estimators to whom he has proposed it have dissented. It is offered here for what it is worth as a matter for future consideration. In any event, it is an attempt to recognize in some way the optional values of such contracts as give the right to purchase at fixed intervals during the life of the franchise.

Table Showing

DATA OF VALUATIONS OF WATER WORKS PROPERTIES

(Located Largely in the Miss. Valley)
Showing
Lack of Relation of Going Value to
Physical Property, Gross Income
and Service Connections

Ref. No.	Population	Water Mains Mi.	Service No.	Value Reproduction of Physical Prop'ty	Total Depreciation	Net Value Physical Prop'ty	Domestic Revenue	Hyd. Rentals	Gross Revenue	Going Value	Going Value per Cap.	Going Value per Service	% Going Value to Net Phy. Prop.	% Going Value to Gross Revenue
1	11269	8½	600	95280	24010	71270	21800	4200	26000	18860	1.67	31.40	26.5	72.5
2	25802	40	3015	710760	73000	637760	72000	23000.	95000	68614	2.66	21.80	10.8	72.3
3	35200	60	6000	1384700	178000	1206700	123000	24000	147000	243430	6.90	40.60	20.1	165.0
4	42000	63	3300	432874	48489	384385	38000	17000	55000	62718	1.69	19.00	16.3	268.0
5	14450	28¼	1922	235336	22336	213000	16900	11100	28000	41500	2.87	21.60	19.5	148.2
6	6070	11	500	103800	25940	77860	11600	3300	14900	8961	1.48	17.90	11.5	60.3
7	2215	13	225	92540	13230	79310	9100	3400	12500	17800	8.04	79.10	22.4	142.0
8	6400	10¼	350	115060	8400	106660	13340	1836	15176	10274	1.61	29.30	9.6	67.8
9	4100	9	166	89800	9500	80300	8700	3750	12450	12830	3.12	77.40	16.0	103.0
10	3050	9	400	92520	14970	77550	12400	8000	20400	23862	7.84	59.60	30.5	116.0
11	38469	45	6217	686100	59800	626300	17000	2000	19000	(None Allowed)				
12	155540	229.2	16491	6441117	740333	5697784	387961	117936	505897	562512	3.62	34.10	9.9	111.0
13	8400	14	1400	182720	32100	150630	18500	5500	24000	32616	3.88	23.30	21.7	136.0
14	36252	48	4040	564027	115019	449008	64700	11800	76500	149823	4.13	37.00	33.3	196.0
15	22962	30	2500	435026	38948	396078	34100	7368	41468	136922	5.96	54.80	34.6	330.5
16	6280	18	1029	90179	33367	56812	14700	6400	21100	26710	4.25	26.00	47.0	126.5
17	12120	27.4	1018	523500	29640	493860	55500	4960	60460	52008	4.32	51.00	10.5	86.0
18	62000	99.8	9040	2437000	198750	188250	147800	44340	192140	324000	5.23	35.80	16.3	168.0
19	83700	130	11000	1736392	137001	1599391	185048	45299	230347	187976	2.25	17.10	11.8	80.5
20	34350	93.8	9183	1321100	156573	1164540	150000	12000	162000	180105	5.25	19.60	15.5	111.0
										Maximum Value	8.04	79.10	47.0	330.5
										Minimum Value	1.48	17.10	9.6	60.5

NOTE:—
In order to include some examples of Going Value where information is confidential all names of places have been omitted

JOHN W. ALVORD, C.E.
Chicago.

TABLE AND DIAGRAM
Showing Estimated
GOING VALUE

To accompany Paper of
JOHN W. ALVORD
Hydraulic and Sanitary Engr.
1207 Hartford B'ld'g.
CHICAGO

Year	Earnings Old Works	Earnings New Works	Difference	Factor	Present Worth
1907	72000	36000	36000	.952	34322
1908	74000	55000	19000	.907	17233
1909	76000	65500	11500	.863	9924
1910	78000	71700	6300	.822	5178
1911	80000	77500	2500	.783	1957
1912	82000	82000			
			Total Going Value $68614		

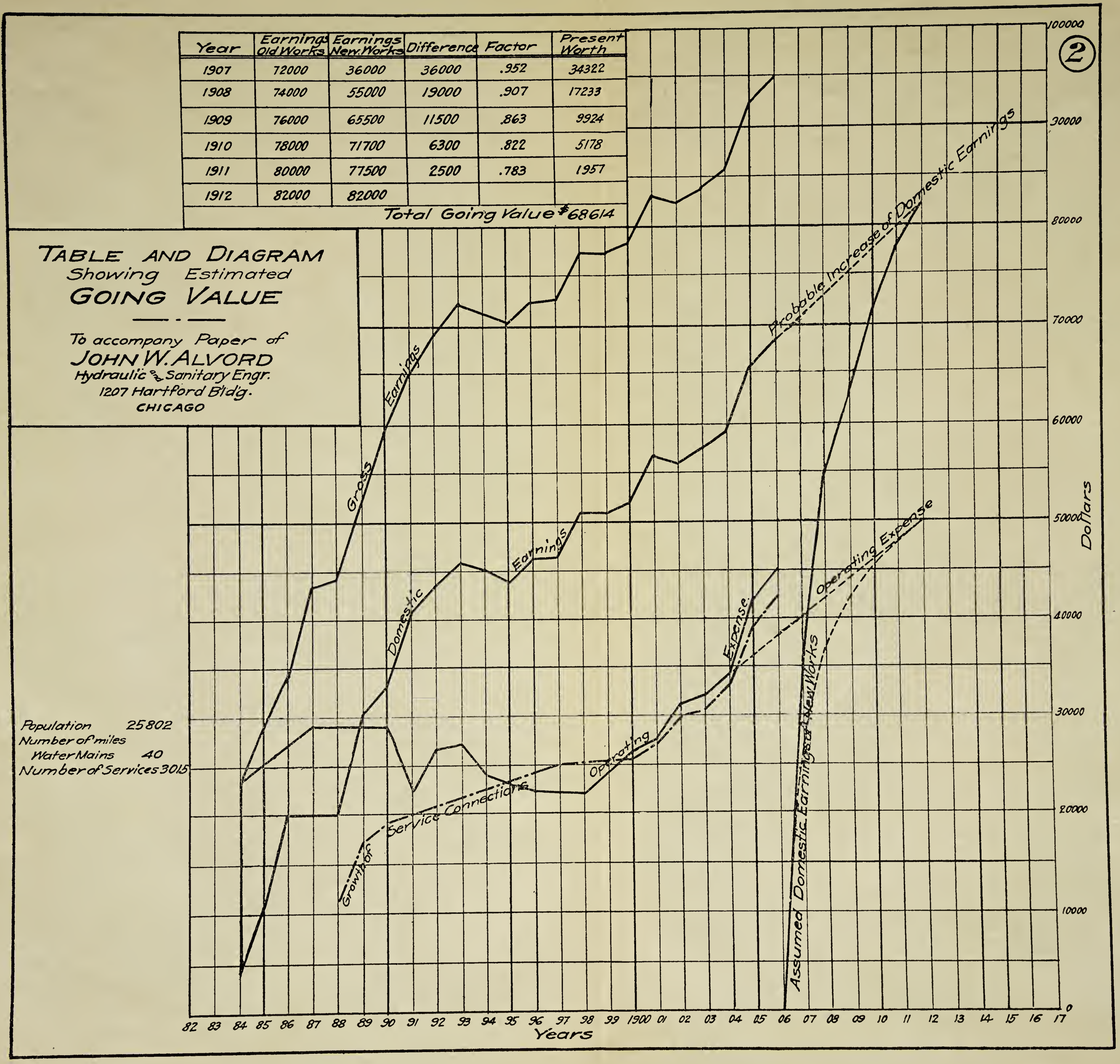
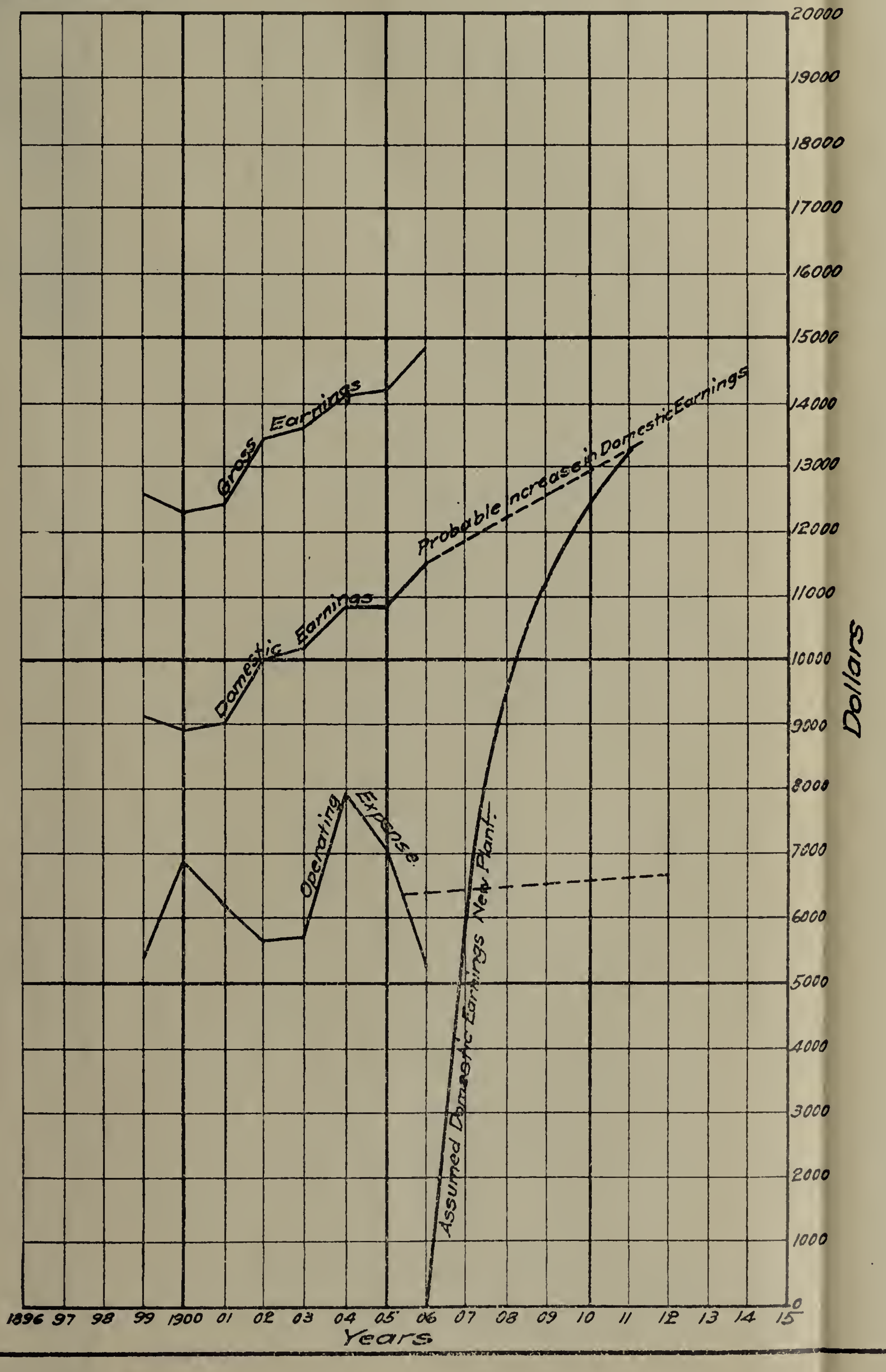


TABLE AND DIAGRAM ⑥
Showing Estimated
GOING VALUE

To Accompany Paper of
JOHN W. ALVORD
Hydraulic & Sanitary Engr
1207 Hartford Bldg
CHICAGO

YEAR	Earning Old Works	Earnings New Works	Difference	Factor	Present Worth
1908	11916	5958	5818	.952	5540
1909	12256	9735	2349	.907	2130
1910	12596	11451	1016	.864	877
1911	12936	12342	503	.823	414
1912	13276	13276	0		
Total Going Value 8961					

Population 6072
Number of miles Water Mains 11
Number of Services 500



YEAR	OLD WOR	
	Earnings	Hydrant Rental
1907	$13340	$1836
1908	13940	918
1909	14540	
1910	15140	
1911	15740	
1912	16340	
1913	16940	
1914	17540	
1915	18140	

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YEAR	OLD WORKS			NEW WORKS.				Difference	Factor	Present Worth Going Value
	Earnings	Hydrant Rental	Total	Earnings	Operation Expense	Interest 4%	Total			
1907	$13340	$1836	$15176	0	$10740	$3750	$14490	$686	.952	653
1908	13940	918	14858	$3000	7740	370	11110	3748	.907	3400
1909	14540		14540	7000	.4740		11740	2800	.864	2420
1910	15140		15140	10000	3540		13540	1600	.823	1315
1911	15740		15740	12000	2190		14190	1550	.784	1215
1912	16340		16340	14000	1340		15340	1000	.746	746
1913	16940		16940	15500	890		16390	550	.710	390
1914	17540		17540	17000	340		17340	200	.677	135
1915	18140		18140	18140	0		0	0	.645	0
							Total Going Value			10274

TABLE AND DIAGRAM
Showing Estimated
GOING VALUE

To accompany Paper of
JOHN W. ALVORD
Hydraulic & Sanitary Engr.
1207 Hartford Bldg
CHICAGO

Population 6400
Number of miles Water Mains 10¼
Number of Services 350

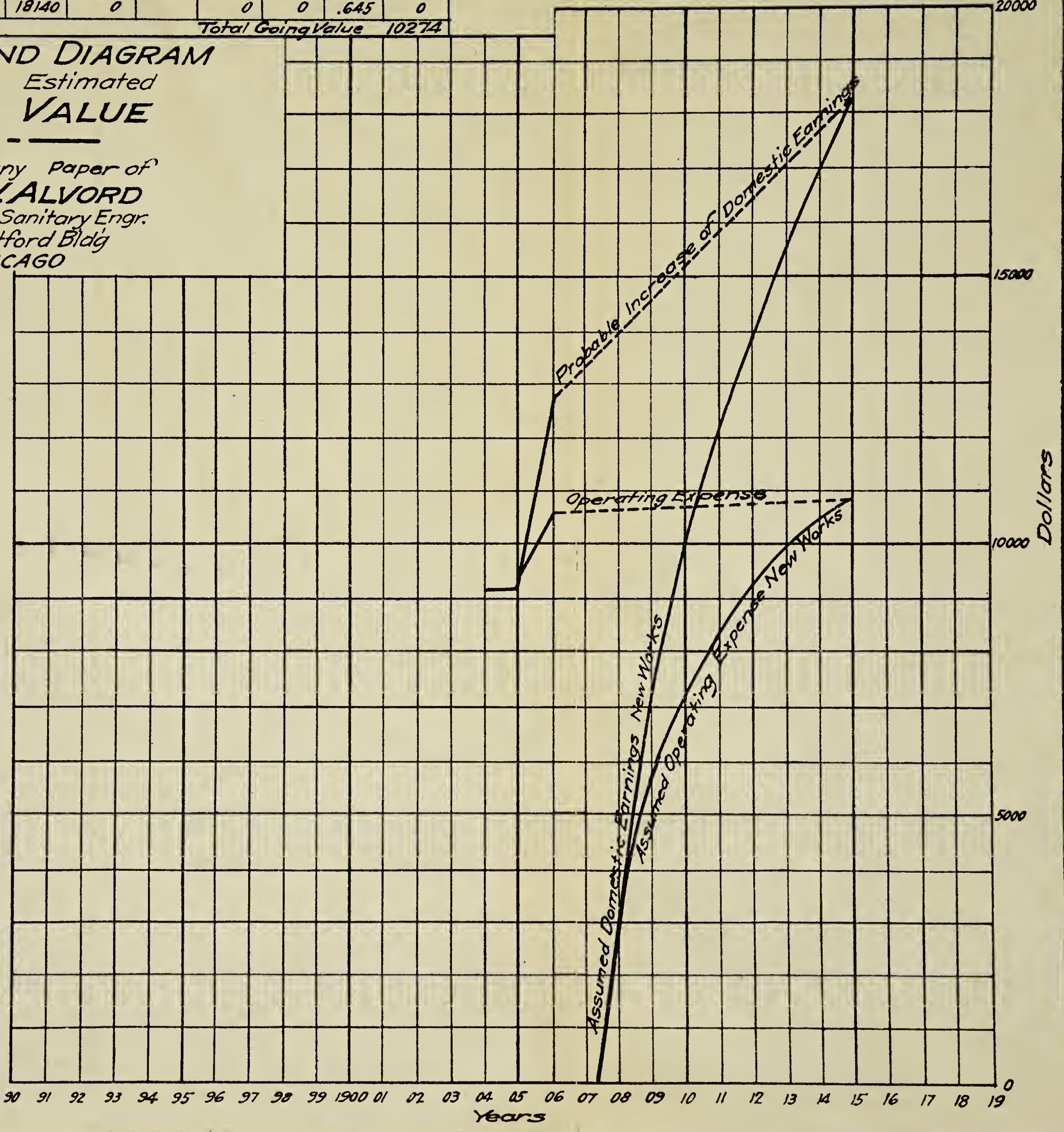

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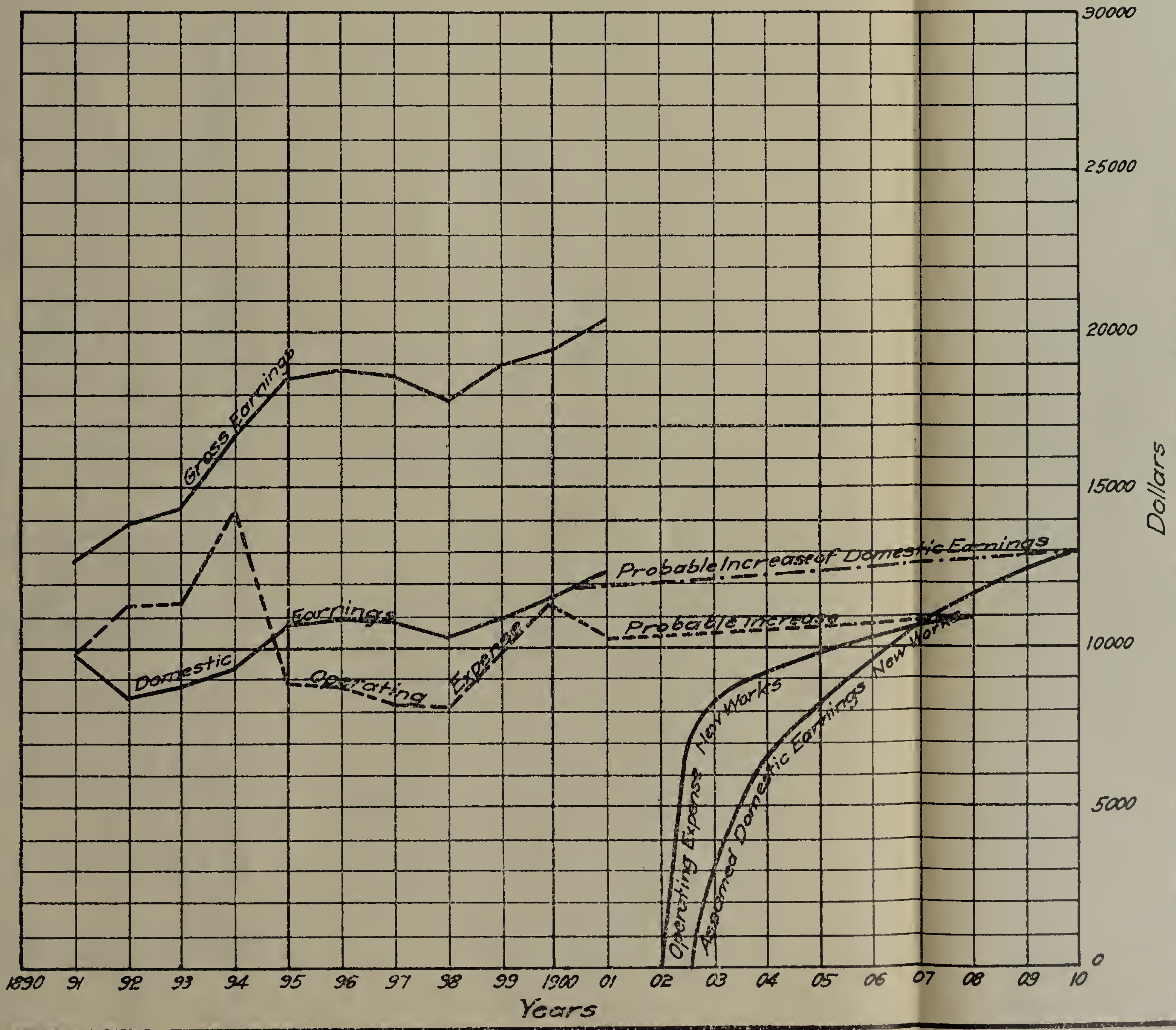
TABLE AND DIAGRAM
Showing Estimated
GOING VALUE

To Accompany Paper of
JOHN W. ALVORD.
Hydraulic & Sanitary Engr.
1207 Hartford Bldg
CHICAGO

Population 3048
Number of miles Water Mains 9
Number of Services 400

Years	Old Works Domestic Earnings	Old Works Hydrant Rental	Old Works Total Credits	New Works Domestic Earnings	New Works Diff. in Operation	New Works Diff. in Interest	New Works Total Debits.	Annual Going Value	Factor	Present Worth
1902	$12000	$7911	$19911		$10000	$4800	$14800	$5111	.952	$4867
1903	12200		12200	$3000	2000		5000	7200	.907	6545
1904	12400		12400	6500	1500		8000	4400.	.864	3826
1905	12600		12600	8000	1000		9000	3600	.823	3000
1906	12700		12700	9250	500		9750	2950.	.784	2360
1907	12800		12800	10500	100		10600	2200	.746	1690
1908	12900		12900	11500			11500	1400	.710	1037
1909	13000		13000	12250			12250	750	.677	535
1910	13000		13000	13000			Total Going Value			$23862



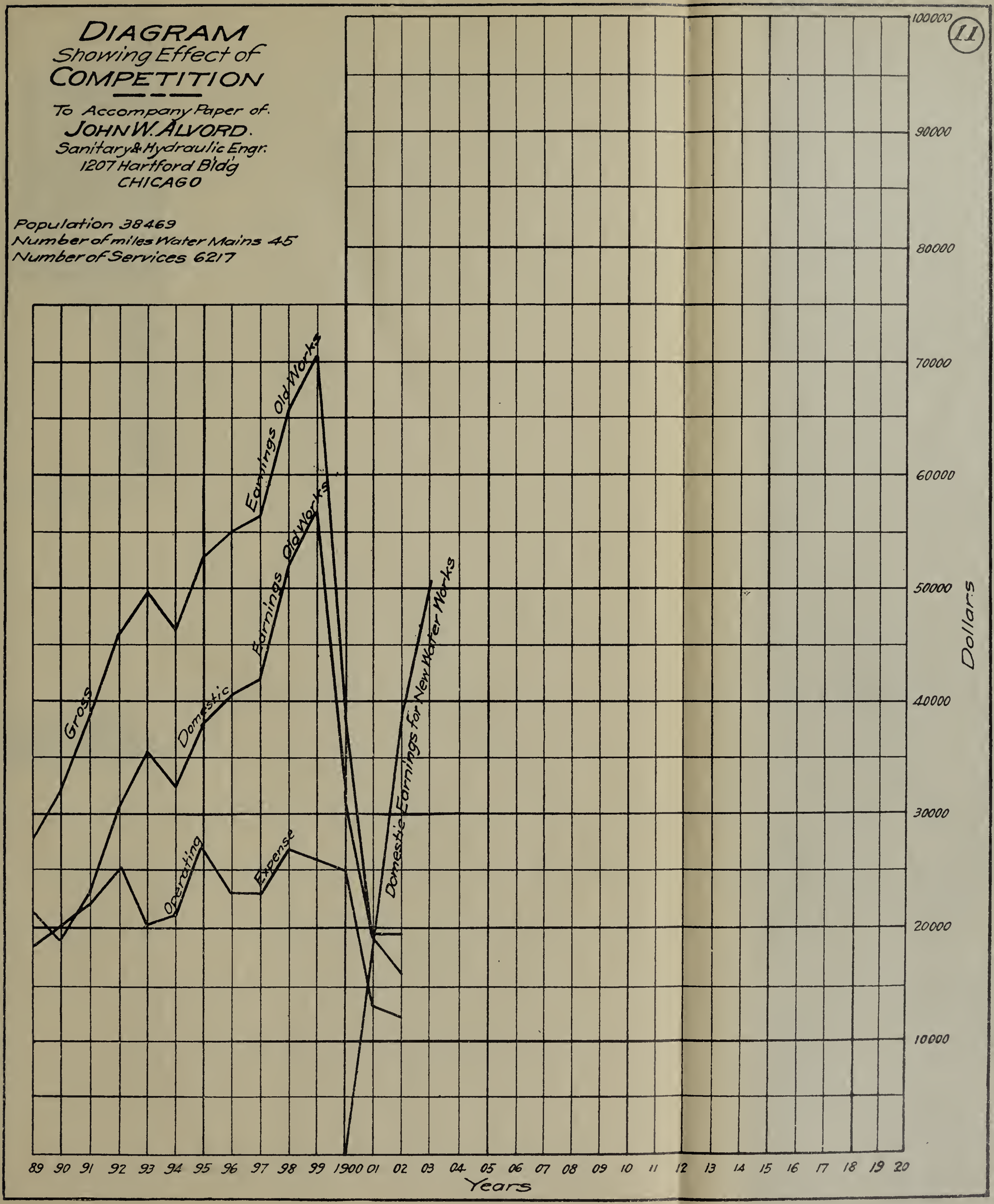


DIAGRAM
Showing Effect of
COMPETITION

To Accompany Paper of.
JOHN W. ALVORD.
Sanitary & Hydraulic Engr.
1207 Hartford B'ld'g
CHICAGO

Population 38469
Number of miles Water Mains 45
Number of Services 6217

	Old W	
Year	Domestic Earnings	Operation
1904	76500	33000
1905	78500	34400
1906	81250	35700
1907	83600	37000
1908	86000	38400
1909	88300	39800
1910	90700	41100
1911	93100	42500
1912	95000	43800
1913	97800	45200
1914	100000	46500

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Population 36252
Number of miles Water
Number of Services 4

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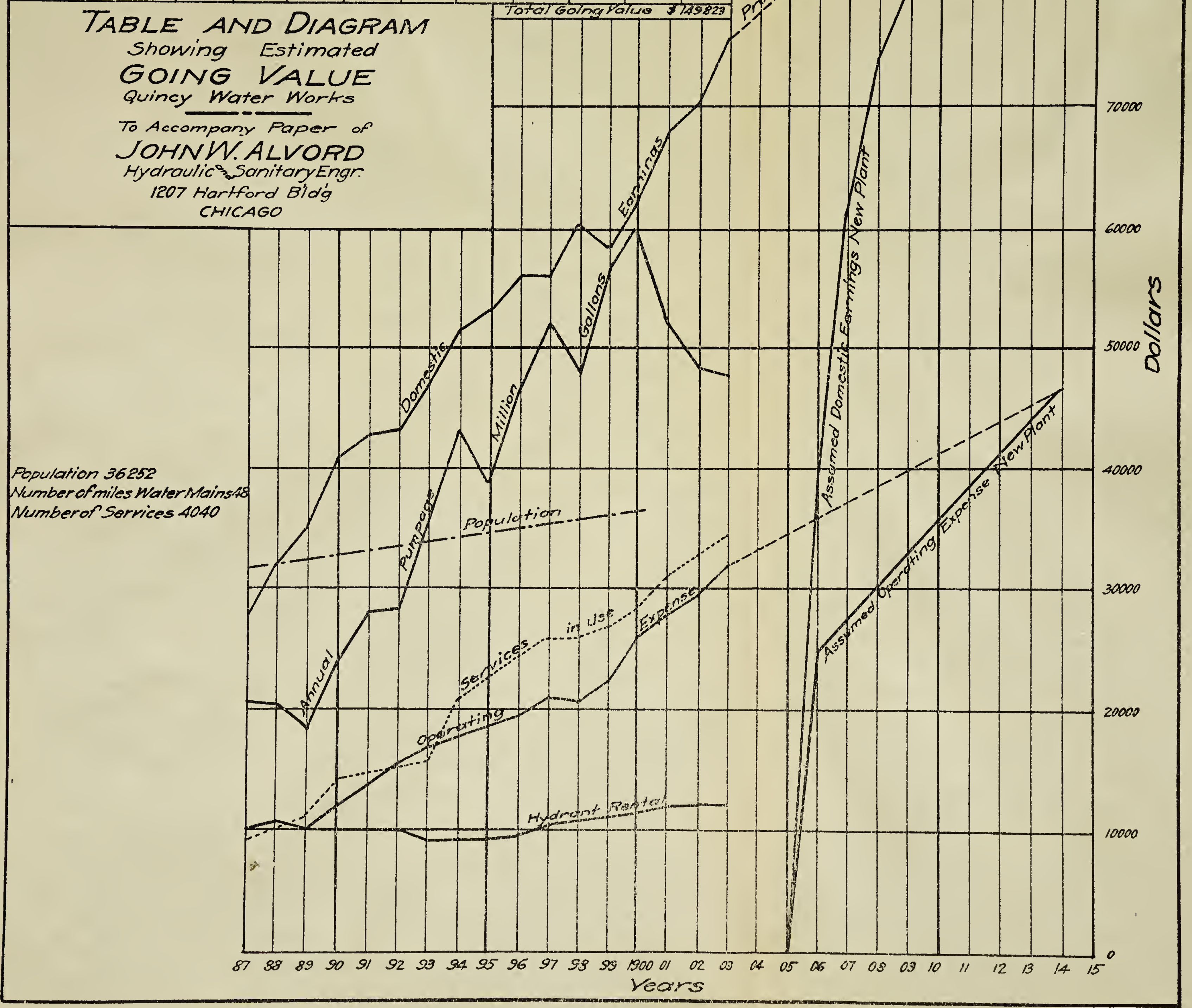
	Old Works					New Works						
Year	Domestic Earnings	Operation	Net Earnings	Hyd Rental	Total	Earnings	Operation	Net Earnings	Interest	Difference	Factor	Present Werth
1904	76500	33000	43500	11800	55300					55300	.952	53088
1905	78500	34400	44100	11850	55950				10000	45950	.907	42458
1906	81250	35700	45550		45550	40000	25000	15000		30550	.864	27159
1907	83600	37000	46600		46600	62000	30000	32000		14600	.823	12483
1908	86000	38400	47600		47600	74000	33500	40500		7100	.784	5836
1909	88300	39800	48500		48500	81000	36500	44500		4000	.746	3160
1910	90700	41100	49600		49600	85500	39000	46500		3100	.710	2356
1911	93100	42500	50600		50600	89300	41200	48100		2500	.677	1825
1912	95000	43800	51200		51200	92800	43100	49700		1500	.645	1050
1913	97800	45200	52600		52600	97000	45000	52000		600	.614	408
1914	100000	46500	53500		53500	100000	46500	53500		0		

Total Going Value $ 149823

TABLE AND DIAGRAM
Showing Estimated
GOING VALUE
Quincy Water Works

To Accompany Paper of
JOHN W. ALVORD
Hydraulic and Sanitary Engr.
1207 Hartford B'ld'g
CHICAGO

Population 36252
Number of miles Water Mains 48
Number of Services 4040



Year	Old Works			New Works.			Annual Going Value	Factor	Present Worth.
	Domestic Earnings	Hydrant Rental	Total	Domestic Earnings	Diff. in. Operation	Total.			
1903	14 700	6400	21 100		2100	2100	19000	.952	18100
1904	15400		15400	10 200		10200	5200	.907	4700
1905	16 200		16200	13 500		13500	2700	.864	2340
1906	17 000		17000	15 600		15600	1400	.823	1170
1907	17800		17800	17 300		17300	500	.784	400
1308	18 600		18600	18 600		18600	0	..	0

Population 6280
Number of miles Water Mains 18
Number of Services 1029.

Total Going Value $26710

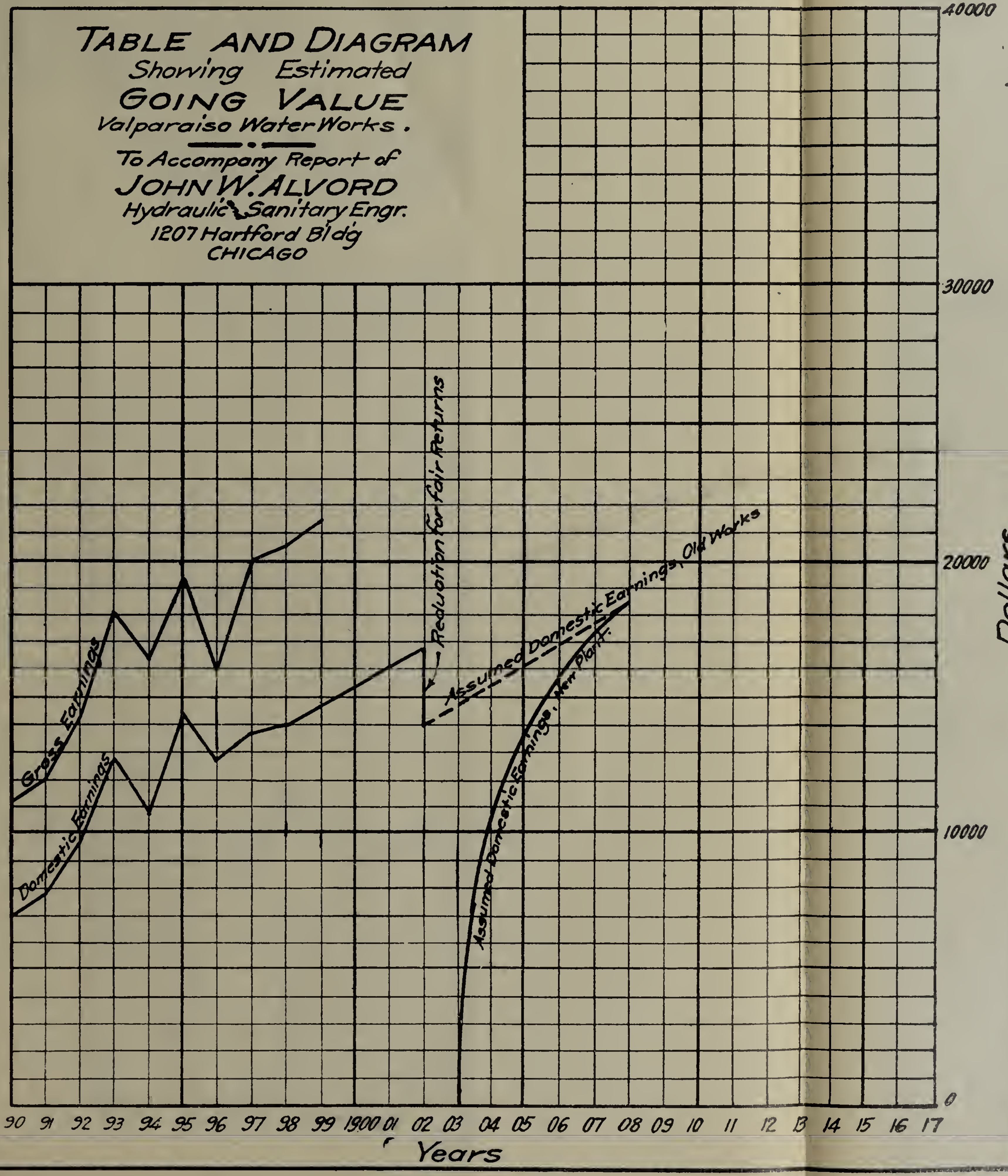


TABLE AND DIAGRAM
Showing Estimated
GOING VALUE
Valparaiso Water Works.

To Accompany Report of
JOHN W. ALVORD
Hydraulic & Sanitary Engr.
1207 Hartford Bl'd'g
CHICAGO

(19.)

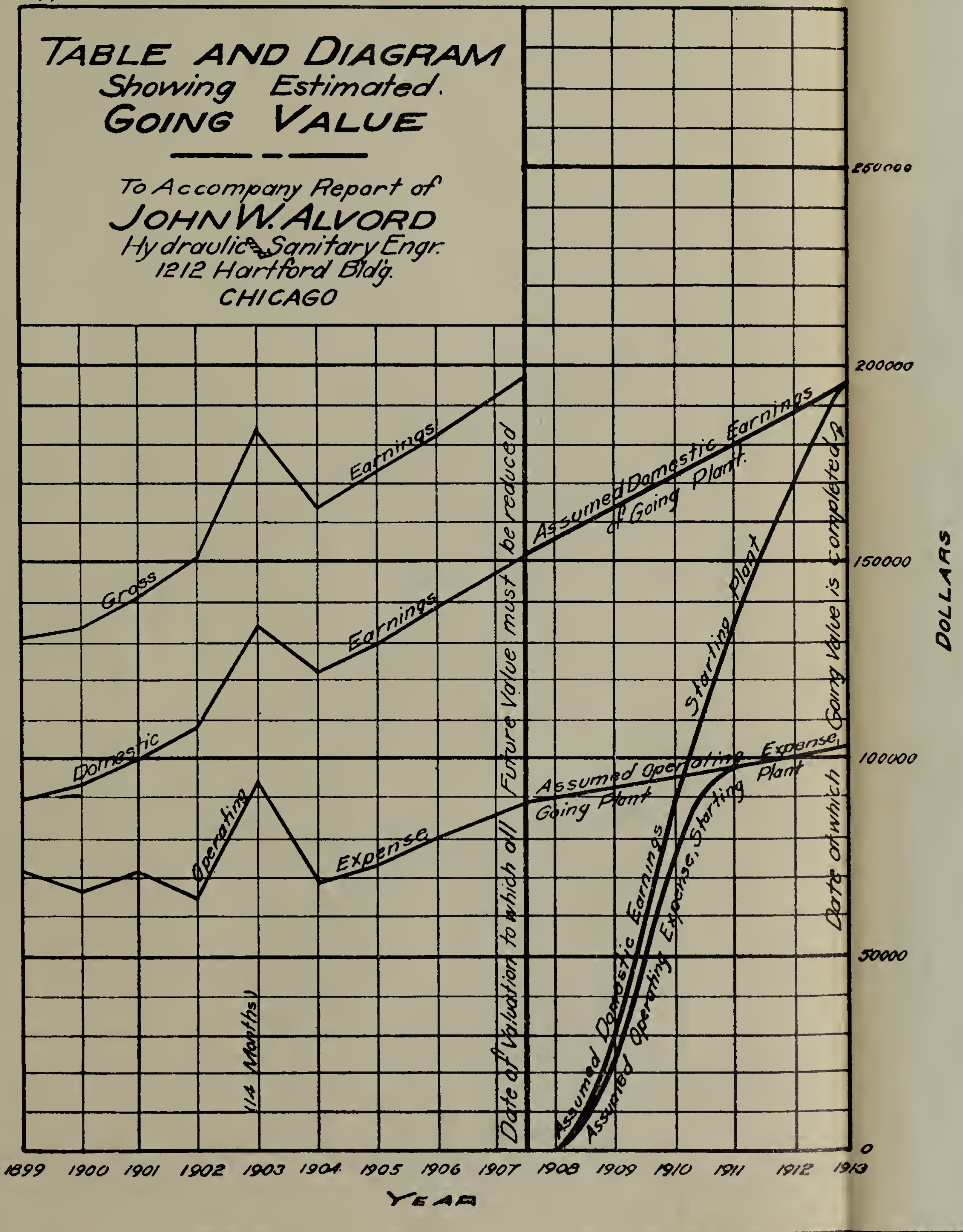
YEAR	Est Future Gross Earnings of the Going Plant	The Same less Hyd. Rentals taken over by New Plant	Est Growth of Gross Revenue of a Starting Plant	Est. Losses in Gross Revenue to a Starting Plant	Est. Future Operating Expenses of the Going Plant	Est. Future Operating Expenses of a Starting Plant	Est Net Credits in Operating Exp. to a Starting Plant	Estimated Net Losses to a Starting Plant	Factor for Present Worth	Present Worth of Net Losses to a Starting Plant
1908	200411	200411	0	200411	89959	0	89959	110552	.952	105246
1909	208681	208681	30000	178681	92529	20000	72529	106152	.907	96280
1910	216951	194197	90000	104197	95099	75000	20099	84098	.863	72577
1911	225221	179323	135000	44323	97669	97669	0	44323	.823	36478
1912	233491	187203	170000	17203	100239	100239	0	17203	.783	13470
1913	241761	195083	195033	0	102809	102809	0	0		

Number of miles of Water Mains - 100
Population (Approx) 80,000

Total Going Value 324051

TABLE AND DIAGRAM
Showing Estimated
GOING VALUE

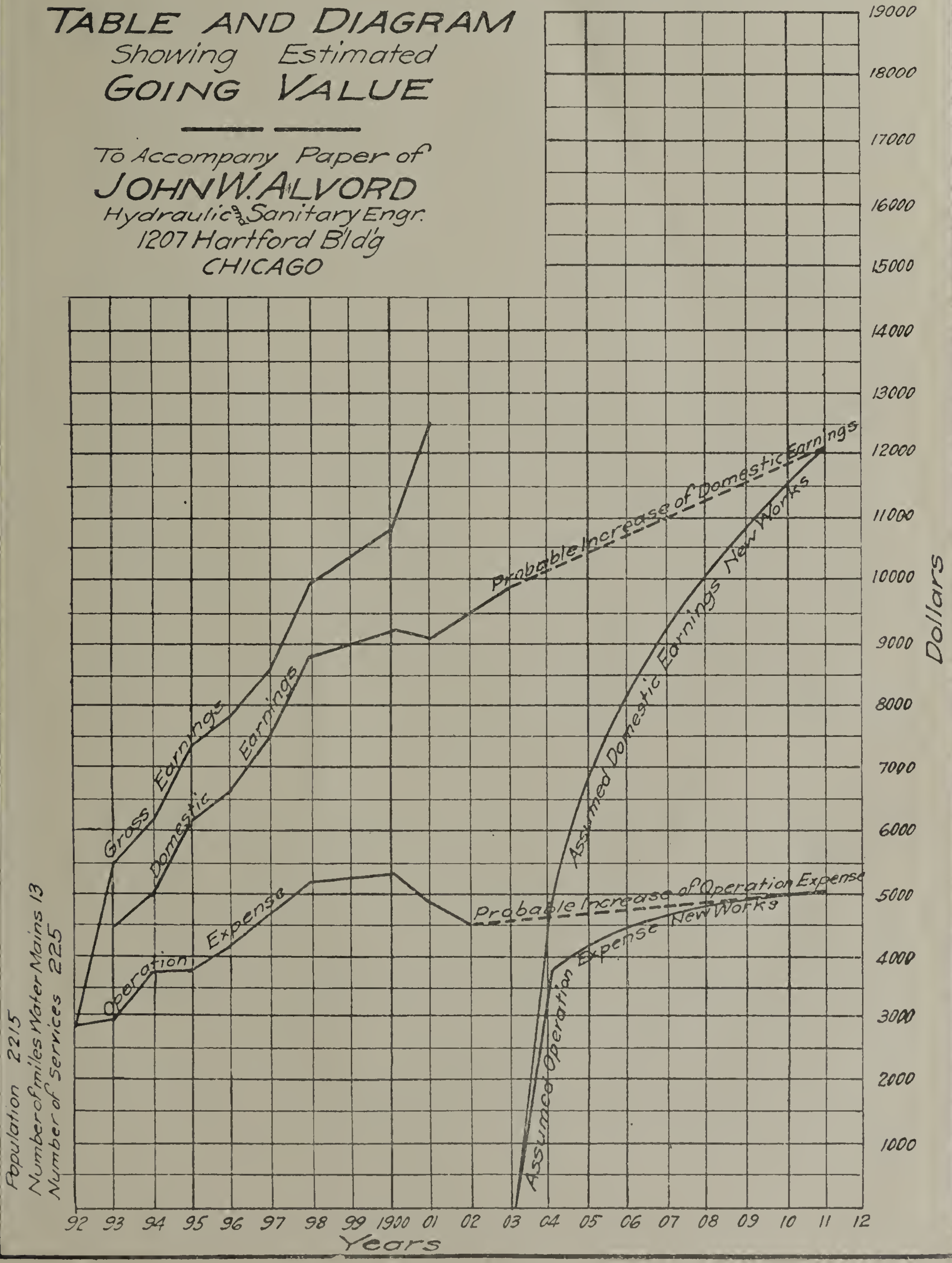
To Accompany Report of
JOHN W. ALVORD
Hydraulic & Sanitary Engr.
1212 Hartford Bld'g.
CHICAGO



YEAR	OLD WORKS			NEW WORKS				Difference Old & New	Factor	Present Worth Going Value
	Earnings	Hydrant Rental	Total	Earnings	Diff. in Operation	Interest	Total			
1903	$ 9750	4520	10270		4700	3000	7700	6570	.952	6250
1904	10000		10000	4400	800		5200	4800	.907	4360
1905	10300		10300	6500	500		7000	3300	.864	2870
1906	10600		10600	8000	300		8300	2300	.823	1920
1907	10900		10900	9200	200		9400	1500	.784	1200
1908	11200		11200	10200	150		10350	850	.746	650
1909	11500		11500	10900	100		11000	500	.710	370
1910	11800		11800	11500	50		11550	250	.677	180
1911	12100		12100	12100	0		12100	0	.645	0
							Total Going Value $ 17800			

TABLE AND DIAGRAM
Showing Estimated
GOING VALUE

To Accompany Paper of
JOHN W. ALVORD
Hydraulic & Sanitary Engr.
1207 Hartford B'ld'g
CHICAGO



CONCLUSION

This paper has extended to a greater length than intended. The subject is one which has always demanded close study and created much discussion among appraisers, and few have cared to commit themselves upon it in public writing. Excellent and conscientious estimators with long experience in other phases of water works valuations, and without serious differences among themselves in physical values, will here find their honest views diverge, sometimes to such extent as would appear unreasonable to the courts and to the public. The effort of this paper has been to show that this divergence is very largely induced by the very complex conceptual conditions which are imposed upon an estimator in dealing almost wholly with future assumed conditions, and involving in its consideration the fundamental philosophy of the theory of valuation by reproduction. The writer believes the theory of reproduction is not simple, but exceedingly complex, so complex, in fact, that it is a serious question whether courts and appraisers would not find it advantageous to ascertain what has been the past actual honest investment in any given plant and property, regardless of its appreciations or depreciations. It is not always possible to ascertain such information, and in many cases, doubtless, it will be impossible, but there is no question but that where it is possible it affords a simple and satisfactory method of valuing for the purpose of basing fair return, while for the purposes of sale or transfer some limited inquiry into appreciation and depreciation should be made in addition.

DISCUSSION

Mr. Daniel W. Mead: In the first place I wish to say that in my opinion the thanks of this Association are due the author for his presentation of such a comprehensive paper on a subject of so great interest. It is particularly fortunate that this paper has been presented by a man of broad experience on the subject discussed, for I know personally that the author has served on all sides of this question.

One of the most difficult features in the work of appraisal in the establishing of values, in fixing depreciation, or in considering the questions of "going value" is the point of view of the men who take part in appraisal work. I believe that it was Josh Billings who said "We are all more or less human." While this is found true in all lines of human thought and action it is found to be particularly true in appraisal work.

No matter how fair-minded a man may be, no matter how ardently he may desire to look at these matters fairly, he is bound to be prejudiced more or less by his point of view. I think that commonly the fact is lost sight of that the questions of appraisal, whether they be questions of valuation and depreciation or the questions of "going value," should be based on higher grounds than an attempt on one side to purchase a plant at the lowest figure possible, or on the other to get as much as possible from the sale of a plant.

It should be kept clearly in mind that in the long run matters of values of public utilities and of rates for their services must be equitably adjusted. It is true, in the case of existing individual plants, that appraisers, courts or public utility commissions may fix values or rates that are not just and equitable and that such plants may get an undue benefit on the one hand, or on the other hand feel the ill effects of unjust findings. In the long run, however, a fair return on a fair investment of capital must obtain, and unless this can be secured, private capital will refuse to invest and the public on their part must finance their own public utilities and operate them. Private capital will not, and cannot, be expected to invest unless a fair return is assured; and such fair returns cannot be based on the interest that would accrue from an investment in government bonds, but must take into account the hazards that are entailed in the establishment of a public utility of any kind and must be sufficient to maintain the investment intact, providing not only for operating expenses, maintenance, depreciation, and interest, but also for all reasonable contingencies of operation and maintenance.

The question is often raised at the present time as to whether or not there is such a factor as "going value." Many have the idea that "going value," as currently expressed, is simply a method of placing an undue excess value upon plants now constructed.

A very brief consideration of the general proposition will establish the fact that, in the building up of any business, whether it be that of furnishing water to a community or the establishment of any private business, the necessary investment is not only the cost of construction, the cost of the physical property, but that there are interest charges, costs of business administration, and costs of development, which are not costs of purely physical construction and are not, therefore, as obvious as the cost of creating the physical structure. The plant must necessarily be constructed before consumers can be secure. It must be operated, in the case of a water works, in order to give the necessary fire protection or to provide for the consumers who are first connected therewith, for some time before it will be on a paying basis. The result is, almost without exception, that after the plant is constructed expenses still go on that are not offset by adequate returns and the creation of an established and going concern is an expense that is just as real and just as necessary as any expense entailed in the construction of any physical feature of the work. It is therefore believed that it will take only a very brief study and consideration of the question to establish the fact that a "going concern" is established only at a considerable expense and that this expense is justly chargeable to the construction account of the plant. The value of this "going concern," established at an actual expense of time, energy, and money, is known as the "going value."

In a great many cases, in fact, I think, in almost all of the earlier cases, the question of interest during the time of construction was considered as a part of the "going value." Later these different expenses were to an extent differentiated, and as a rule, I think, in appraisal work at the present time the interest charged during construction is considered as purely an interest charge, and an attempt is made to establish as nearly as possible the actual cost value of the "going concern" apart from all other costs of establishing the plant and business.

To establish a "going value" which can be considered as fair and equitable, even to the mind of the individual appraiser, is a very different proposition, and to establish such a value which will be satisfactory to a full board of appraisers, is almost impossible. Men will differ radically in their conception of the various factors that must enter into this value, and the result is in most appraisals, almost without exception, that there is a very great difference in opinion when that subject is reached.

In cases of this kind we can only expect to secure substantial justice. In cases at law we are not able to prepare a mathematical formula by which substitution of certain values and exact results can be obtained. But outside of a few unfortunate cases, I believe that we all feel that in the courts of this country substantial justice is reached. We can expect nothing better in the establishment of "going value."

The arguments and illustrations that the author has used in this paper have been the results of some ten or fifteen years' consideration by a number of engineers who have been engaged in this work. The author has treated this subject fully, and, for the most part so much along the lines of my own line of thought, and has expressed it so much better than I could have done, that I shall not attempt to enter very largely into the discussion of the paper.

I notice one point, however, in the latter part of the paper in regard to which I wish to make a brief statement. The author writes, on page 201:

> It has been suggested by the writer that certain modifications may be made in going value, due to the fact that in many franchises, in the West at least, the municipality often holds an option, or right to purchase plants at an appraised valuation at given intervals of time during the life of the franchise. Such option necessarily is of value to the city holding it. Etc.

The author seems to suggest the general idea that possibly the question of "going value," or the "going value" itself, should be modified by the city's option to purchase. I believe that this suggestion is wholly illogical. The right of purchase is entirely a contract question. If a company agrees by contract to build a plant, which at the expiration of the franchise shall revert to the city, the contract is doubtless a good one, and the company would necessarily lose its entire plant at the time of the expiration of the franchise. The contract would also be valid if the franchise provided for the purchase of the plant on a valuation to be based purely on the physical features of the work. In which case, perhaps, no "going value" could be considered. I can conceive no reason, however, for refusing to consider any feature of the construction or any element of value of a plant, or of modifying such values on account of an option to purchase, whether these values be purely the physical value of a reservoir, or of installing a pumping engine, or of the cost of developing the "going value," or of the cost of establishing any other feature of the plant. All of these expenses must be entailed in the construction of every plant; and unless it is especially provided in the original contract between the parties to the franchise contract that certain values are to be eliminated or ignored, I can see no reason why the city should, on account of having the right to purchase either at the end of the franchise period or at any other time, be entitled to a reduction in the cost of the construction and development of the plant. All such rights, if exercised, have a definite value of themselves, and if a company has accepted a less satisfactory and less valuable franchise, on account of such reserved purchase rights, there seems no just reason for further depreciation of the property on account of such rights.

Mr. William Bishop: I am entirely unfamiliar with the actual work of valuation, but highly as I esteem the general trend of the paper presented by Mr. Alvord, and the scope of the discussion which has taken place, there seem to be some points which need a caution.

To the lay mind there seems to be a disposition on the part of some public utilities to reach out and grasp some intangible, elusive asset which they realize is there, and on which they frequently spend considerable money.

This is here denominated the "going value." But why should it be paid for on the surrender of a franchise?

When the viewpoint is changed this asset is no longer intangible or illusive, nor is it shrouded in mystery.

If it be conceived that two plants, identical in all respects, are built, their respective owners seek franchises, the city grants one, not the other; the difference in worth of the two plants clearly shows both the "going value" and whence it comes.

We will grant that this "going value" thus created is capable of increase by judicious management; should this increase be paid for?

When a man rents a piece of land to another, the latter fertilizes it—spends money on it to increase his revenue—when the land reverts, does the owner pay for its increased capacity?

Then why should a public utility be reimbursed for expense incurred, in an effort to increase its revenue, even though it increase the "going value" also. Any increase in the plant itself will need adjustment; but the increase in the "going value" will not.

A few years ago there came to the knowledge of the speaker a tentative offer of $2,000,000 to a city for its water plant and rights. The cost of the plant was less than $300,000 and it yielded a net income including the interest on investment of about $14,000. Under no circumstances could an increase of more than 50 per cent in net income be expected without large increase in capitalization. That is not a very enticing business opportunity; what did they want? They were after the *potential going value:* they wanted the provisions of the special franchise granted by the state which gave to the city the right to use certain waters and to lay pipes on any highway, railroad, or canal in the state.

Put an adequate plant behind that proposition and see if there is mystery about "going value" or to whom it belongs, especially if the $2,000,000 had been accepted.

Daniel W. Mead: In answer to the last speaker I would say that the position he has assumed is entirely illogical. He has made several assumptions that are not warranted. I would like to ask him how it would be in the case of a company that has taken an unfortunate franchise? Many of the water works plants in this country have never received a fair return upon the original cost of the construction, or sufficient to cover depreciation,—not considering the cost of creating "going value." There are many water works in this country that have not paid the men who put their money into them, one cent. They have been working under unfortunate circumstances; and in order to create the business that they have acquired, they have been obliged to go to a large expense and have made large extra investments. The city in granting a franchise is not handing over to a company a one-sided contract, beneficial to that company only. They are receiving definite value, for they are receiving the things that are necessary in order to build a city. Cities in granting franchises are perhaps throwing onto a private company a duty which may belong to the municipality itself. Not desiring to invest their own money, they are shirking their responsibility, and putting the risks upon private individuals, or a private company. That company may, or may not, make a profitable investment—out of their purchase contract. We are up against two sides to this proposition. The company may succeed financially, or they may not succeed. There are many men in the water works business today that will remember that twenty or twenty-five years ago a franchise was looked upon as a golden opportunity for reaping large returns. And many who were too eager to invest at that period have realized that these anticipations have not always materialized. While a company may in a comparatively short time reap a large reward, it might lose it several times over in other investments of a similar character. There are many water works in this state that are in the latter condition. They have never actually made a dollar upon the money investment after loss of interest, depreciation, and operating expenses are taken into consideration. Why, then, because a franchise has been granted by a city when a contract supposed to be mutually advantageous has been entered into, and when that franchise expires and the question of valuation is to be considered, should the cost of creating any one feature of that plant be waived any more than we should waive the cost of all the features of the plant?

As I have said before, these questions are purely questions of contract. If the contract provides that these matters shall be waived, well and good, no matter how unfortunate it may be, it can be legally enforced; but with a contract freed from these technicalities, where the city has the right to purchase and purchase at a fair valuation, I maintain that the valuation should include every dollar of cost that is honestly put into development of that plant. I believe as we look into the matters more at length we will all come to that general conclusion. I should perhaps have said in the first place that this matter of "going value" is one that is well established in the minds of all who have given due attention to appraisal work. We should certainly look at it from every side of the question. We certainly want to get expressions of as broad a character and from as many viewpoints as possible, in order that ultimately we may reach the basis for a fair decision; a fair basis of estimating this intangible but no less real value of every public utility.

Mr. Wm. Bishop: We are told the position assumed is "illogical" because several assumptions were not warranted. The only things assumed are—

(1) That "going value" is that increased worth of the plant which comes by reason of the operation of the plant.

(2) That "going value" is dependent upon the franchise.

(3) That, being dependent upon the franchise, the "going value" goes with the franchise and belongs to the owner of the franchise.

These are the assumptions: Are they logical?

(1) Surely the definition of "going value" is the same as that in the mind of the last speaker when he differentiates between it and the cost of construction of the plant.

(2) By increasing your plant, your "going value" can be increased indefinitely until the moment the limit of your *franchise* is reached; that moment the increase of "going value" stops. "Going value" without a franchise is nothing, it reaches its maximum when the franchise is utilized to its maximum limit; therefore "going value" is dependent upon the franchise.

(3) Is not this a self-evident proposition? Transfer your plant to some one else, the "going value" will go on just the same. Transfer the franchise to some one else, do you still retain your "going value" with the plant?

Then the owners of the plant have something they own and something they do not own, both of which they are developing for their own interest, when the time comes for the reversion of that which they do not own, a little common sense should be used and the ordinary laws of reversion be applied.

Will you kindly point out the flaws in the logic?

In answer to the last speaker, I would like to ask what difference it makes to the principle whether the franchise was an unfortunate one or not?

It no doubt affects the whole value of the plant, but it does not affect at all that portion which belongs to the public utility, excepting in so far as it may have demonstrated the inefficiency of the plant itself; and if the city which gave the franchise is purchasing the plant, it is worth just as much as if it were earning large dividends.

As a rule public utilities—(it may be that occasionally their origin is philanthropic)—are formed with the belief by their stockholders, that they can be made to pay; and they go to the municipality with certain propositions in order to get their franchise, which of necessity is an asset of value.

There is grave reason to doubt whether any city or other government which does not own its streets in fee simple, has any right to grant a perpetual franchise; hence in every such case public utilities must look eventually to surrendering their franchises to the city again, and why the city should be expected to pay for that part of the value which its own act created, is passing strange.

It must be kept in mind that the city or municipality is the *people*, and every charter honestly gotten is given by them or their representative body; whatever may be the reasons why they have not utilized the rights they now delegate to others, we are bound to believe that to them these reasons seemed good and sufficient; when any differ sufficiently to seek the neglected opportunity, though they may be doing a work which the municipality itself ought to do, though the city may reap great benefits from it, even though undertaken because of encouragement by the municipality itself, they must stand or fall by their own judgment.

Every individual, every public utility, when the time comes to surrender privileges which have been granted, is entitled to a just settlement. No governing body has a right to take advantage of forced liquidation; on the other hand public utilities have need to remember that all they have to sell, is what they hold in *fee simple* or equivalent title.

Mr. D. W. Mead: In regard to the assumption made by the last speaker, I would say that the first assumption, if correctly interpreted, is practically correct,—the second and third are, however, in error. While the "going value" is the increased worth of the plant which comes by reason of its operation, such "going value" has been created by an actual expenditure not usually considered as a portion of the cost of the installation. This expenditure is, nevertheless, just as much a part of the cost of placing the plant in running condition as any cost of installing any of its physical parts. For example, let us suppose that a plant has cost $250,000 for its physical construction. This sum has been expended to provide an ample water supply, construct the station, purchase and install the pumps and lay the water mains and appurtenances. The plant is now ready for operation but has no consumers. As soon as completed the plant must begin operation for purposes of fire protection or to provide for the first consumer. A force of men must be at hand at the pumping station day and night. The pumps must be operated regardless of the quantity of water furnished. For several months, and possibly for several years, the income is not sufficient to pay operating expenses, not considering interest and depreciation which go on day and night regardless of the number of consumers. If the business of the company is conducted on proper lines, an interest and a depreciation fund will be set aside from moneys provided by the original financial arrangements to meet these expenses, and finally, it will be found when the plant actually begins to earn a sufficient sum to cover operating and fixed charges that the actual cost of the works up to that date is considerably above the original $250,000 cost, and will, let us say, approximate $300,000. This extra $50,000 invested is the amount that has been required to create a going concern and is as legitimate a charge against cost of construction and value of the going plant as any other part of the installation. Going value *per se* is entirely independent of the franchise, although the compensation received for this element of value as well as for the value of every physical feature of the plant may ultimately depend upon the franchise. If the plant cannot be operated without a franchise, the "going value" may be seriously affected as far as the company owning the plant is concerned. The same may be said of the mains, the pumping engine, and every other physical feature of the work. For if the franchise expiration terminates the operating period of the plant, the only value left may be the scrap value of the physical features of the plant. No thinking man advocates such a basis of valuation at the present day.

How "going value" should be treated in various cases is, perhaps, a matter for argument and depends upon the questions involved.

The Wisconsin public utility commission in its recent findings in the case of Payne and others, of Marinette, against the Wisconsin Telephone Company states:

> If property is devoted to the public use and reasonable care has been exercised in all the phases of its management, but the owners have not yet received a fair return during the earlier years of the operation of the plant in which the property is used for the convenience of the public, the deficits thus incurred must be made up out of later earnings in so far as this is commercially possible and expedient.
>
> In other words, every effort honestly put forth, every dollar properly expended and every obligation legitimately incurred in the establishment

of an efficient public utility business must be taken into consideration in the making of rates for such business. Collectively, the elements just referred to may be designated by the term "going value," and in this sense there can be no question regarding the propriety and justice of admitting "going value" as a consideration in the determination of rates. Whether this "going value" should be made a part of the permanent capitalization of the plant or provided for by means of a sinking fund, or other fund, is a matter to be decided on the facts of each particular case. If it is made a part of the capital investment, it becomes a permanent charge against consumers for all time to come. If it is provided for by means of a sinking fund, all persons who are patrons of the plant during the period in which the sinking fund is accumulated will alone contribute.

The fairness of this proposition cannot be questioned.

It may make no difference in one sense as to whether a franchise has been fortunate or unfortunate, but the last speaker assumed in his first remark, that all water works companies have received adequate returns, which is not the case. True justice, either in the establishment of rates or values, should certainly take past consideration into account, and if the earnings of the company have not been sufficient to amply liquidate the cost of creating its business, then such expense must be recognized, both in the establishment of rates and in the final valuation of the plant.

I agree with the last speaker that "every individual and every public utility when the time comes to surrender privileges granted by municipalities, is entitled to a just settlement," and that no valuation should be based on forced liquidation. This principle requires a careful consideration of every element of value in the plant, and the "going value" must fairly come in for its due consideration, and in almost every case, is a credit that must be recognized. This fact is becoming so well established as to be almost beyond question, as witnessed by several recent public utility discussions.

Mr. A. A. Reimer: I think that to any student of economics the question of the reality of "going value" of any public utility is not open to much discussion in his own mind, for certainly there is a real value attached to it. I do not care to discuss that matter now because it has been pretty fully discussed by Mr. Alvord and others. There is just one point I wish to touch upon, and that is the last point brought out by Mr. Alvord in his paper, with regard to the city's option.

It seems to me that that particular matter is open to very grave question as to whether it should be considered either for or against the would-be purchaser, that is, the municipality.

If we as engineers or contractors enter into a contract to do certain things, we expect to live up to the provisions of the contract, and we figure the cost of so doing, and I believe that the same rule holds when a private company, a public utility company, takes a contract—for that is all a franchise becomes in one sense of the word. By it there is given the right to do certain things provided other things are done in return. The operating company is legally bound to do certain things under that franchise, and the cost of doing these has been figured before the franchise is taken.

It seems to me that if an option clause to buy on the part of the city is in the original contract that nothing should be deducted or added, when the time comes for a city to exercise the right it holds under this franchise, or contract, which ever you wish to call it. For that reason I cannot see what it was that actuated Mr. Alvord in giving some value to this option clause in the cases that he mentioned in that closing paragraph, but I would like to know what it was that led him up to the point where he was willing to ascribe some value to it.

Mr. J. W. Alvord: The causes actuating me to advance this opinion are perhaps put forward in rather a tentative way, and I shall have to admit that the proposition was purposely so stated in order that I might invite criticism. Apparently I have been successful.

The thought is not one that has been very fully discussed by appraisal boards, not fully enough discussed to even satisfy myself that we have seen it from all of its various aspects. I do not know if I am prepared to fully discuss it myself; I have a few clear ideas about it which I am certain are right. They are these: That the option which the city holds to purchase after, we will say, a five years' interval, is a valuable right. I think you must all concede that it is a valuable right; a right that no one else possesses; a right which in a profitable enterprise, at least, some one may be very desirous of possessing.

The city has foreseen that it would be a valuable privilege, and they have reserved to themselves that privilege. Now take the case of a profitable plant. I have in mind one case that was a very profitable plant and in which the value of the option was very apparent. The company resisted very strongly the attempt of the city to purchase under that optional clause all the way along the line, because they were enjoying a very profitable business. The city had by its contractual relation reserved the right to acquire this plant, this business. Now if it is true that it is a valuable privilege, there must be some method of valuing it. If any one else holds it it will not apply; if the city holds it, they ought to acquire it. If they do acquire it, how are we to measure it? That is the first part of the proposition. The second part of the proposition is that going value is in reality made up of two parts. The first part is the part due to the fact that while the plant is being constructed it is not earning anything. The second part is due to the fact that after the plant is completed it must then, and then only, begin to acquire business. The second part of going value is usually paid for in cash. It is a cash outlay straight through. Our attempt to measure it is only an attempt to estimate the value of the cash that has to be paid in to reproduce it. The first part of the going value is not a cash outlay on the part of the company, but it is an advantage which after years of time they acquired as against all newcomers, as a sort of unearned increment.

Now take the case of a city that is considering the question whether they will build or buy a utility that is already in operation. It is obvious that if they have no option they must forfeit this consideration. If they build they must lose revenue while they are building. Therefore this real advantage which the utility company holds is worth paying for, although the company may not themselves have paid anything for it. That part of going value it seems to me is closely connected with the fact that the city have had the foresight to reserve to themselves the privilege of purchase, in the form of a valuable option. That is as far as I have gotten in my own mind. There may be things about that I do not yet fully see; but I cannot conceive that going value, like a pump, for instance, is a completed thing. I conceive it has an intangible value which necessarily depends upon the conditions surrounding it. If conditions are such that the city has reserved the right to at once step into the position of the utility company without having to undergo the necessity of awaiting the construction, either actual or theoretical, that right has some value, and that value is pretty justly and properly measured by the loss of revenue during a theoretical reconstruction, which is the first part of going value, the part that resembles an unearned increment.

Mr. D. H. Maury: I have read Mr. Alvord's paper with a great deal of interest, and with a great deal of gratification that he should have given to this association so extremely valuable a contribution to its literature.

In reading it I was impressed from the very start with the pure logic of his argument. He seems to start with a fair and unbiased mind, and to present his reasons, step by step, in so clear and logical a manner that no one who gives the time to read the paper carefully can fail to be impressed with the fact that a man who knows his subject is taking infinite pains to make it clear, in a fair-minded manner, to others who perhaps do not.

I quote from the paragraph on page 190.

> If going value is reasonable at all, it is reasonable because it is logical; and if logical it must be founded on data that are logical.

That, until I reached page 201, seemed to me to be the keynote of Mr. Alvord's paper. Turning, however, to page 201, my attention was at once attracted by the statement put forward, as Mr. Alvord says, in a very tentative manner and not as a certainty; but the same statement, to which reference has already been made by Mr. Mead and Mr. Reimer, and which appeared to me to depart at once from the logical path which had been heretofore followed by the author.

An option to purchase is an option to purchase. It is one of the considerations of the contract. It is one of the benefits which the city receives from the company under the agreement. It must be measured by its terms, and nothing should be read into those terms which is not there, or which could not have been contemplated when the terms were drafted. I do not think any one can say that any option clause in any contract ever contains, in addition to the provision that the city shall have the option to purchase, the further provision that when it exercises this option, the appraisal shall not be made in the usual manner, but that the appraisal shall be made in a manner entirely different, which shall take away from the going value the element of value which inheres in it as a result of the losses due to the construction period.

I do not think that any contract was ever drawn in which either party ever contemplated that that construction would be placed on the option clause. Therein I think that Mr. Alvord departs from the logical path which he has followed up to that time. In his laudable desire to do justice to both sides, he seems to be confronted with the necessity of putting a value on this option, which as he conceives and truly says, is a valuable thing.

The duty of the appraisers, however, is to determine the fair value of the water works property. They are not appointed to value an option to purchase; and unless the option to purchase should contain some definite provision to the effect that the city, in exercising the option, should have the right to exclude certain definitely specified elements of value, then the appraisal should be made in the usual manner, and with no deductions whatever on account of the option clause.

It should be at once admitted that an option to purchase under appraisal may be a thing of great value.

Let me suggest as a fair construction of the value of that option, that it be considered as the difference between the valuation made as a result of a fair appraisal, an unbiased appraisal, and the price which might be put on the plant by a company which saw its opportunity to hold the city up to a value greater than the actual value,—which it might do if the city wanted to purchase and did not have the option to purchase. That is the only value which, so far as I can see, inheres in an option. I certainly cannot see how so strange and forced a construction can be put upon language so perfectly clear and plain, nor how any one could assume for a moment that the language of a simple option to purchase could be construed along the devious path that leads up to the estimating of the "going value" in two separate items, and to the offering of one item to one party and the other to the other party.

Now coming to a minor detail of the paper, I was interested to note on page 193, under the heading, "Recovery of Revenue," various items which should influence fair-minded appraisers in figuring the going value and arriving at it by the detailed methods laid down by the author. Right here I should suggest the use of a slightly different term from that employed by the author. I think that "Acquirement of Revenue" would be a better term, because a new plant has never had revenue, and therefore is not recovering it.

Under item (*c*), the author mentions "The physical possibility of connecting and plumbing large populations," as one of the things to be considered.

I think it should be realized that the organization of a very greatly increased local plumbing force will require time in any community. If plumbers who have been conducting the business of connecting up water works services to houses, and installing house fixtures inside, have been accustomed to put in three hundred to five hundred services in the course of a year, and then are suddenly called upon to put in as many as they can, I do not think that in the first year they would be sufficiently organized to do the work. I do not mean organized into unions, because the further danger arises right there that they may be so organized in the unions, that when you call upon them to do the work they may offer obstructions. What I am referring to is the matter of getting the plumbing work done, and the difficulty in doing this the first year by a sufficiently augmented force. The writer infers that the services will perhaps go in at a greater rate during the first year. I am rather inclined to believe that service pipes will go in at a greater rate the second year than the first year, and that then the rate at which they are put in will begin to taper off.

One other consideration that I think might well be brought forward here is this: pursuing the details of this calculation of revenue on the broad principle of what is "humanly possible," laid down by the author, it is not right to assume that the starting plant, in taking on, for example, three thousand services the first year, will actually get the full revenue from those three thousand services that year. There is the freezing season, which in the average town in this country begins, say, in December and lasts along to and through the first two or three months of the following year. So that while there may be three thousand services put in during any year, the average date at which they are put in will be about August 1, so that only about 40 per cent of the total average annual revenue will be realized from them for that year.

As to going value, I believe that a fair estimate of going value can only be made upon the assumption that the rates charged by the corporation are fair rates. If the rates are too high, it will be unfair to give to the corporation a going value based upon these excessive rates. If the rates are too low,—with the same volume of business represented as in the case of the higher rates, the same length of time of service, the same number of connections, the same time required to build up the business,—if the rates are too low, it would be equally unfair to mulct the company by basing its going value upon rates which are not sufficient to pay the proper returns.

It has been stated, perhaps not in this connection strictly, by my friend Mr. Metcalf, in a most admirable paper which I think ought to be in the hands of every one who is interested in this subject,—a paper which was recently read before the American Society of Civil Engineers—that to attempt to determine going value upon a basis of fair rates would be to argue in a circle, because to increase or reduce rates would be to increase or reduce the going value; and one would have to determine two unknown quantities, and therefore could reach no definite conclusion.

At first blush that would seem to be true, but it is not strictly true. It is true that you cannot make an algebraic formula which will lead you at once to the correct result; but there is one constant element in the calculation which holds you solidly to the ground, and that is the physical value, which does not change. Now the method of procedure in order to calculate going value on fair rates would be about this:

The estimator would take the actual rates; he would know the physical value; he would figure the going value at the actual rates; he would add the going value to the physical value; and see whether the actual rates gave a fair return. If the actual rates gave too low a return, then he would raise the rates to another figure, and make a new calculation of the going value, add it to the physical value, and see whether the rates gave a fair return. The second time he would probably be closer to fair rates and to a fair going value; and so, by a cut-and-try method, he would ultimately come nearer to correct results, in proportion to the number of approximations that he made, finally arriving at reasonable accuracy.

In conclusion, I repeat that this association has reason to be very much indebted to Mr. Alvord.

Mr. Leonard Metcalf: As one of the younger members of the Association I have some diffidence in rising to speak on this subject; but it seems to me that Mr. Alvord has done such genuine service to this association and to those interested in water works valuations that it would be unseemly for me not to rise, having been very much interested in this general subject, and having given it a good deal of thought and study. No one could read Mr. Alvord's paper without recognizing that it was written by a fair-minded man. I know of no subject, as Mr. Mead has said, and ably said, which requires more careful consideration, greater freedom from bias, and greater breadth of knowledge than this question of water works valuation.

Perhaps it would be of interest in connection with this discussion to revert to the difference in forms of franchises which have prevailed in different parts of the country, because it seems to me that that has an important bearing upon the question of valuation.

In the east the majority of our franchises for water service have been what are popularly known as perpetual franchises, or, if not perpetual, at all events very long-term franchises. That leads to a very different state of affairs from the franchises with which you are more familiar in this section of the country, which are limited to short periods of fifteen, twenty, twenty-five or thirty years.

Now, while it is true that the present-day tendency is toward reserving to the public, as I believe should be the case, the franchise value,—that is, the value which arises from the right to do business and to enjoy the future increase in profit in the business,—we must not forget that the older works which were built under different conditions are deserving of a just recognition of the conditions under which the contracts were made. It is true that, in the last ten or fifteen years this fact has been increasingly clearly recognized, as any one who has studied some of the English cases, more particularly the London water works valuation cases, will know, from the sterilization clauses, so-called, which have been introduced into those contracts; clauses which were definitely drawn to retain to the public any increment in value growing out of franchise rights. The same desire has been recognized in Massachusetts in more recent years in reserving to the community all increment in franchise value in water and in gas works, so that these public utilities may be bought or taken under arbitration proceedings at a later period, by the public, without its having to pay for the franchise element of value.

In this particular matter which has been raised by Mr. Alvord in this last clause on page 201, referred to by the previous speakers, it seems to me that he has touched upon this very franchise question, and perhaps a separation, if that is possible, a mental separation, a mental conception of the difference between the going concern value as an element of value and the franchise value will be helpful, difficult as I recognize the consideration of this subject to be.

Broadly speaking, we may consider that in value we have certain elements to consider, the original cost, the reproduction cost, the going concern value, and the franchise value. There is a means which Mr. Alvord has beautifully outlined, of figuring the going concern value. The reproduction cost of a new plant can be figured closely, and it has been my experience that experts in figuring reproduction cost usually arrive at estimates within from two to five per cent of one another. On the depreciation question, which bears upon reproduction cost, there is a greater divergence of opinion. But there is no known method, so far as I am informed, of figuring independently the franchise value. The method which has usually been used has depended upon capitalization of the earnings of the company, and then a subtraction of the other determinable elements of value, and the throwing of the difference into franchise value. That method is open to certain dangers, to one of which Mr. Maury has alluded, if it means that the larger your earnings are the greater your capitalized value, the greater the value as figured by capitalizing the income. That method is open to the objection that it does not give proper consideration to the question of the fairness of the rates, which is, of course, of great importance.

Referring to the matter of which Mr. Maury has spoken, (making allusion to the paper recently presented by me before the American Society of Civil Engineers) the objection that I raised to the decision which he has quoted, which was the decision in one of the Maine water works cases, known as the Waterville case, was that it assumed premises which made determination of value impossible; for the court held that the water works were entitled to a reasonable profit based upon value of its entire property, including franchise value, and based also upon fair rates. But the only known method of determining the franchise value involves capitalization of rates, and these same rates are based upon this franchise value in part, not solely upon cost or investment, as Mr. Maury suggests. How could you then measure or determine the fairness of the rates? There was not under such requirements, as you see, any definite starting point; the higher the rates the larger the net earnings and hence the apparent franchise value, or the higher the value placed upon the franchise the higher the rates could be without being unreasonable, since the rates were by order of the court to be based upon the value of the company's entire property as a whole, including tangible and intangible property, franchise and going concern values as well as physical values.

As a result of the Waterville litigation and other suits affecting some other works owned by the Maine Water Company and allied interests in Maine, another opinion was handed down by the Supreme Court of Maine which has further elucidated the views of Judge Savage (who wrote the Waterville opinion) and which has been of great assistance to experts interested in this subject.

Judge Savage's later theory, as laid down in the Brunswick opinion, written by him, is fundamentally this,—I speak of it particularly because it has a bearing on what one of the previous speakers has said in regard to the reservation of franchise rights to the public,—the rates must be based on cost as an element of value, but that it must not be assumed that the original or reproduction cost solely shall be used for this purpose, for if the community did not elect to take the responsibility of building the works and to take the chance of loss, it is not entitled to have the earnings or the rates figured on the bare original or reproduction cost. In other words, it is to be assumed alike from the point of view of the water company and of sound public policy that the public at the time of construction would have been and was willing to pay more for the service, or to pay a return on a larger capitalization, than would be represented by the actual investment; rather than to undertake the risk involved and build its own works; this leads to the suggestion that it is reasonable to increase the cost of the production of the works or the reproduction of the works, by a certain sum upon which the projectors or the builders of the works shall be entitled to earn a return in the same manner as upon the capital actually put into the plant. Now I do not care to take your time or to weary you with a full discussion of what all that means. But it seems to me that it does give a definite starting point for consideration of the rating problem, also for valuation, which we did not have before the Brunswick opinion was handed down.

In Mr. Alvord's paper there is one assumption to which I want to refer, which bears upon this point and upon this quotation from page 201 which has been referred to. Mr. Alvord assumes in figuring his going concern value that the new plant which is built shall continue in growth until it overtakes the income of the old plant, and he assumes further that the old plant shall continue to gain in income during this period of years after the date of taking until the new plant has overtaken the old. In other words, he figures his going concern value, not upon the present income as of the date of taking, but upon the projected income, when carried forward for a certain period of years corresponding to the interval of time required for this development. Does not that, gentlemen, pertain in some measure to franchise rights,—to the increment in income,—rather than simply to the going concern value, which has to do with the establishment of the business and of the income existing as of the date of taking?

In other words, is it not true that the portion of the income which is in excess of the present income, as of the date of taking, is really an increment which the company will enjoy as the result of its franchise rights? It seems to me that it is this value which may be considered perhaps as the measure of the city's right to take the plant previous to the expiration of the contract period, provided the contract is so drawn as to give the city this right.

From my present point of view, if you admit that you are figuring a going value concern upon the present income of the works rather than upon future income, it seems to me that there is merit in Mr. Alvord's suggestion.

Now, just one word more in regard to methods of valuation and point of view. William S. Wallace, Esq., a very able corporation lawyer of Philadelphia, presented last winter before the Pennsylvania water works (managers) association a paper in which he discussed certain questions relating to valuation, and summed up the difference between the Pennsylvania and the Maine decisions on water works valuation so admirably that I am tempted to tell you in a few words what he said. In substance, he said that the attitude of the Pennsylvania court is to assume that the property is entitled to the income which it is earning if it is a reasonable one,—to a reasonable income, provided it can earn it. In the Maine court opinions, to which he refers, he says the court has a double standard,—first, the worth of the service to the consumer, and second, reasonable earnings for the water company. The two standards are not very different under most circumstances and lead to the same result under reasonable interpretation. The Maine standard is perhaps the safer from the public point of view, making in fact the worth of the service to the consumer the final criterion; but the Pennsylvania court opinions may lead to the same result, provided we take a reasonable standpoint in determining what is a reasonable income. And after all a fair standpoint is absolutely necessary and of greater importance in valuation than the angle or theory from which you view the matter.

Mr. Alvord has referred to the conceptual angle of a "humanly possible" state of affairs, and I think that he has outlined the essential points to you admirably. I have sometimes tried to express the same idea, when I have met men who were inclined, as it seemed to me, to make the smallest possible allowance for reproduction cost and everything else, by saying that in a water works valuation you are not entitled to make your valuation from the point of view of "hindsight;" you must do it from the point of view of "foresight," for there are always, as you as practical men know, unexpected expenses of construction and operation in the early years which must be considered in figuring the cost of reproduction.

Mr. Dabney H. Maury: I should like to thank Mr. Metcalf for making clear the distinction between the conditions obtaining when the franchise value has to be appraised, as in the case of a contract involving a perpetual franchise, and those which exist when the franchise value is excluded.

In the former case, as he correctly says, the whole valuation would usually have to be determined by capitalization of income, the physical value, going value and franchise value, all being included in the gross result. Except in a case such as the Waterville case, where the Judge held that the franchise value must be considered in fixing fair rates, it would always be possible to determine fair rates and fair going value after having figured the physical value; and the difference between the whole value found by capitalization of income, and the sum of the physical and going values found as previously explained, would represent the item of franchise value. This separation of the total value into its component parts might not be at all necessary, but it would at least be an interesting exercise for the minds of the appraisers.

Mr. Metcalf raises another very interesting question when he asks whether that portion of the gross income which is in excess of the actual gross income at date of taking is not really an increment which the company will enjoy only as the result of franchise rights. There would certainly seem to be some ground for the argument that to include this increment would be to include a part at least of the franchise value.

After listening to this admirable paper and to the able discussions which followed it, Mr. Metcalf's question is, I believe, the only one which has raised any doubt in my mind as to the manner in which going value should be calculated. While I confess to some uncertainty in the matter, I am still inclined to believe, for reasons which I shall not take your time here to explain, that the increment referred to should in fairness be included as a part of the going value.

But this question is, I feel sure, one which should be settled for all time by appraisers at the outset, in defining broadly the methods by which going value should be arrived at.

I cannot conceive that a simple option to purchase at a certain time, under an appraisal made to determine the fair value of the plant at that time, can mean anything more or less than what is specifically set forth by its terms. The option may be of great value to the city, for unless the city had the option, the company might force the city to pay far more than the value of the plant. But it is no part of the appraisers' task to determine the value of the option, and a simple option cannot affect the value of the plant nor alter the method of determining that value.

Mr. W. H. Winslow: I would like to ask Mr. Alvord if his conception of going value includes the possibility of its having a negative value; that is, is it the same as the business value? Now in ordinary business relations when a business that has been running a number of years is offered for sale people may be willing to pay for it just what it costs to reproduce it, or they may be willing to pay more, or they may desire to pay considerably less. Now does this total value, this going value, necessarily have a positive character? Assuming it possible that a water plant like a great many other businesses may be of less value after a given number of years than its original cost, because conditions are such that it cannot earn a reasonable return on the cost, now if that is the case, is your conception of going value such that it may have a negative value?

Mr. J. W. Alvord: If I catch the meaning of the question I would say, as I have attempted to answer in my paper, that the negative feature of going value perhaps would be the destruction of the physical value. As long as there is any income it is doubtless the fact that it has cost something to produce it. When all the income is destroyed the going value is destroyed, but with it also the physical value is destroyed; and if I clearly catch your idea you might assume that the going value is a negative value; in fact when it is lost the physical value begins to suffer or is destroyed.

Mr. W. H. Winslow: The idea is this, that in buying a concern no one would pay its structural cost unless it was earning at least the market rate for money.

That might be 4, 5, or 6 per cent. As I read your paper it did not seem to me that your idea of going value was practically synonymous with the business value. It seems to me according to your idea that it must have a positive value. Then you assume that the total value is worth more than the cost to reproduce the plant as long as it is earning anything. That is different from the business value, because the business value of the plant is less than the reproduction value unless the income is equal to or higher than the value in the market. If we assume that the value of a plant for the purpose of sale is distinct from its cost or reproduction value when its earnings are greater or less than the ruling rate of money, why then I think my position is right, that the city should pay simply the structural value, and that would be so whether in one case it would pay less than the plant was worth and in the other case it would pay more. Certainly no franchise or contract either ever stipulated that the city should have the right to purchase at a certain time and that it should pay more or that it should pay less than the plant was worth. This may be something entirely different from your conception of going value. If it is, why then it is not particularly relevant; but that is what I wanted to get at, whether this going value was according to your idea synonymous with the business value. If that is the case it must have a negative value unless the revenues are at least equal to the fair rate of interest.

Mr. J. W. Alvord: I do not think the going value is at all synonymous with business value. Going value is the cost to reproduce the income. You may have so small an income that the property as a whole is very much depreciated as to its business value, but nevertheless the income which it has is worth something, it has cost something and has a value over that of a plant with no income. That is my conception, at least.

Mr. W. H. Winslow: Of course the negative situation would never arise because as long as a company was not earning a fair rate of interest the city would prefer to let them continue to enjoy the situation.

Mr. H. F. Dunham: It often happens that a property which does not earn a revenue that would make it attractive at the moment has still a value in excess of cost because of the outlook for the future. This is with regard to the simple market value. The same reasoning would apply to any other than water works property.

In the early part of the paper under discussion particular mention is made of an imaginary plant, yet there are references to the necessity for fixing in mind an imaginary plant that closely resembles the actual plant. In the first reading it seemed to the speaker not irrational to drop the idea of an imaginary plant and to keep in mind only the plant under consideration as far as it can be described and the facts learned in regard to it throughout its history and up to the date of appraisal. So it was with greatly increased interest that the speaker found on the last page of the paper this paragraph:

> The writer believes the theory of reproduction is not simple but exceedingly complex, so complex in fact that it is a serious question whether courts and appraisers would not find it advantageous to ascertain what has been the past actual honest investment in any given plant and property regardless of its appreciations or depreciations.

This seems to coincide with the idea in the speaker's mind when considering the relation between the imaginary plant which is the subject of the first two pages of the paper, and the actual plant which may be under appraisal.

MR. J. W. ALVORD: Of course the theory of reproduction is only one method of finding value, there are other ways of finding values. The value of a plant may be found by its first cost, the actual investment, plus its appreciation, or minus depreciation. It may in some exceptional cases be found by its market value, if there is a market value; and the courts have well said that all these elements of finding value should be considered. Necessarily here we are confining ourselves in considering going value to the method of reproduction. I think that should be clearly borne in mind. Whether it is the best method in any particular case will always depend upon local circumstances. In many cases it is impossible to get the past honest investment in the plant, and therefore we are forced to the method of considering what it would cost to duplicate it.

MR. DANIEL W. MEAD: I want to say just one word that I think is important at this time, in answer to Mr. Winslow's question. I believe that the question of going value as ordinarily conceived in this part of the country is entirely apart from the question of business value. It is believed that there should be a fair return from every public utility, based on an honest investment and a reasonably well constructed and conducted plant. That being the case, the question of whether or not the plant is earning would not affect the fact of the going value.

The plant would have a going value even if it were losing money because it would lose less money having an established business than if it had no business whatever. So that under my conception of going value it is always a positive element, and is entirely apart from the business value. I think that that explanation is necessary to clear up the matter.

MR. D. B. A. GRAHAM: Being one of the younger members of this society it is with great diffidence that I venture to express any opinion upon the subject which is now under discussion. In my mind, however, there is a very clear distinction between "going value" and "business value" when considered in water works valuation. In regard to the question brought up by Mr. Winslow, therefore, I would like to mention a few things which may help to put this distinction in a clear light. As Mr. Alvord has said, and he lays special emphasis upon this point, going value is the cost of reproducing the income of the company, and therefore, if this income is positive, however small it may be, the going value also must be positive.

In plants where the franchise gives the city the power to regulate rates, and this is almost universally the case, the size of this income and consequently the business value, as Mr. Winslow defines it, is regulated by the city. If, therefore, the income of the company is so low as to make this value negative it is neither logical nor fair to cause the water company to suffer a decrease in the value of its plant on account of conditions which are beyond its control and which are entirely independent of those found in ordinary competition. If the theory suggested by Mr. Winslow was put into practice we can readily see that a city contemplating the purchase of a plant could absolutely destroy or render negative the business value by lowering the rates just previous to the valuation of the plant.

MR. WYNKOOP KIERSTED: Mr. Alvord's paper on going concern value is timely, and he is entitled to sincere thanks for having given to the association this interesting paper. The writer has perused it with much interest and is loath for want of time to enter into a discussion of the many important points which the author has raised in his thorough and characteristic way. It has been the writer's good fortune to have personally discussed going concern value with Mr. Alvord on various occasions during the past few years, and he had hoped to see some simple method presented for computing going concern value, particularly in view of the inherent weaknesses in some at least of the methods thus far employed both in the assumption upon which the line of reasoning is based and in the reasoning itself. This fact is apparent from the wide variations of individual views upon the subject.

An attempt to establish a rule based upon scientific lines of reasoning and upon earning capacity only is sure to result in a fallacious conclusion to a greater or less extent, for the simple reason that the premises upon which the line of reasoning is based are to a degree mere matters of assumption allowing of a wide range of individual imagination and unlimited argument.

A properly designed, well constructed and thoroughly maintained physical property is the foundation of all values, and for this reason going concern value cannot depend wholly upon earning capacity as separate and distinct from the value of the physical property. Moreover, equitable earning capacity depends upon equitable rates, and equitable rates depend primarily upon the fair value of the physical property. Earning capacity and going concern value, franchise value, patronage, good-will, and any of the other elements of value or the considerations which go to make a successful public utility, cannot endure without a substantial, well maintained and developing physical property. While in fact structural value dies with the loss of earnings, still it is also a fact that there can be no substantial or permanent earning capacity without a substantial, well maintained, well organized and well managed physical property. This is the history of every public utility; it is the history of every piece of property artificially created and subject to the wear and tear of continuous use. Moreover, two pieces of physical property having precisely the same net earnings, but of wide variation in the matter of the cost of reproduction, may have a variation of going concern value distinct and separate from the variation due to the inequalities of the cost of reproduction. The condition of the water service as well as the cost of reproducing it is a factor for consideration.

An element of consideration the author seems to have overlooked in his discussion is the hazard to which a property must be exposed which is constructed at a cost much in excess of that needed to meet present requirements of the community in which the public utility is located. This hazard exposes the owner of the property to serious loss of interest upon his legitimate investment, to serious obstacles in the way of financing the property, and to danger of bankruptcy while waiting for the future increase of population and patronage to bring adequate return. This is particularly true of a private company operating a public utility under a limited franchise.

On the other hand the writer would regard as of important consideration, the defects of service resulting from the use of a highly deteriorated physical property which is altogether inadequate to meet the current demands of its patrons, to say nothing of provision for meeting in proper form and with a proper degree of safety and success, the emergency requirements which arise periodically in the operation of every public utility.

The relative hazard in a slow growing but substantial town and that in a rapidly growing and developing city are also matters of consideration. The liability of having to abandon property representing judicious investment in the latter case is much greater than in the preceding case, and greater regard must be given to investments in anticipation of future requirements. In short there are decidedly business considerations as well as technical considerations which must enter into computations of going concern value.

In this connection the writer desires to emphasize the point that equitable net earnings must be dependent upon the characteristics and value of the physical property, and that being the case, there is so intimate a relation between going concern value based upon earnings and value of physical property that some simple rule might be devised by which going concern value can be estimated as a percentage of the value of the physical property with due consideration of the local conditions. Perhaps a rule of this kind might be devised which would bridge over the inconsistencies and inequalities in the present methods of computing going concern value, harmonize extreme partisan views with regard to this element of value, and eliminate the confusion often arising between going concern value and franchise value.

There is probably little doubt but what the views of our courts basing present worth primarily upon the cost of reproduction under existing conditions is decidedly rational and introduces less obscurity and less danger of error in estimating present worth of a public utility than would any method based entirely upon past structural costs.

It is to be hoped that so valuable a paper as that of the author will receive broad and candid discussion.

MR. JAMES B. McDONOUGH: In your paper on "Going Value," there is one point I do not understand. I refer to your suggestion that the city's option to purchase should be recognized in some way. It is not clear to me how this option can affect the value of the plant. If I have an option to buy a house, my option may be of great value, but I cannot see that that adds to or takes from the value of the house. The value of the option may be great to me because of the bargain that it brings me but it is not clear to me how that value can affect the value of the thing sold under the contract.

MR. JOHN W. ALVORD: On the "option" question, Mr. McDonough's illustration of the house seems to me to be a fair one, but I think he does not follow it clear through to the end of the comparison.

Let us assume that he owns a house which, we will say, is rented, and producing a revenue which would cost a real estate man's time, fee and advertising to reproduce. Let us assume that I hold an option to buy his house at the cost of the duplication of the physical property plus the cost of establishing the income, and that this option holds for the end of say, every two years, or some other like period. For the purpose of making the illustration parallel, let it be assumed that no other house is immediately available, and if it is required that such a house be had, his house must be purchased or a duplicate of it built. Now let us suppose that John Doe wants to buy his house, having no option but having the alternative if he will not sell to him, of building a duplicate house of his own, but of course losing the rental *while he is building*.

Now is it not plain that if I should exercise my option I do not have to wait to build or lose any rental while building, therefore I could not be made to pay more for his house on a duplicate basis, than the duplication of its physical value plus the cost of duplicating its income, because my option entitles me to step into the enjoyment of his property and rental at a specific time, without having to face the certainty of losing rental while building. John Doe on the other hand, not having any such option, desiring to own Mr. McDonough's property, finds that it is worth not only what it costs to duplicate it, including the income, but also something for the advantage that he possesses by reason of the fact that Mr. McDonough's property is *already built* and he may with propriety ask Mr. Doe something for the advantage he has over Mr. Doe in the losses of rental he would sustain *while building*. He properly reasons therefore, that he can afford to pay Mr. McDonough, perhaps not all, but the greater part of such losses of revenue while he would be building, while I, holding an option and exercising it, do not have to consider the possibility at all.

It seems to me that this is a very good illustration of what I am suggesting in the ordinary water works valuation, that is, to recognize the option which the city is exercising when it takes a water company's plant in conformity with its contractual rights, because if the water company is selling to an outside party or selling to the city on an informal negotiation at some other period than the option date, or is being valued for rate making purpose, it may have and will have a value greater than the cost of duplicating the physical property and income by a part at least of what would be lost in net rentals during the construction of an alternative plant. Necessarily, it would not be all of these net revenues, as that would not produce a "willing buyer," the alternative of building a duplicate plant being equally attractive to the proposed purchaser.

Mr. Benezette Williams (by letter): It is the opinion of the writer that Mr. Alvord's paper is a most valuable contribution to the cause of rational proceedings in the valuation of *public utilities*, and that his insistence upon the need of sound and clear conceptions of the principles which underlie *public utility values*, is not the least valuable part of his contribution.

In this connection, special emphasis should be placed upon the fact that it is *public utilities* which are under consideration, because one of the most fruitful causes of confusion was, and is still to a considerable extent, the failure to distinguish between a plant serving the public exclusively under a franchise granting special privileges, in which there can be no competition, and a manufacturing plant that has no special privileges, and that supplies needs of the people in some line where private competition has free play, and into which the use of public property, such as streets and commons, does not enter.

It may be said that primarily, all values that attach to public utilities grow out of the physical plant and its earnings. *Physical or structural value* can only be determined on the basis of original cost, that is, by the actual, legitimate investment in the utility, or upon the reproduction structural cost, made as of some particular time, with such depreciation as the conditions warrant.

The older conception of what are now known as public service corporations, and public utilities, which was based upon the theory that a company operating under a special grant from some legislative authority was its own master, and not subject to rate regulation or control, is fast giving place to a newer and sounder one. Franchises, or grants conferring special privileges, were and still are, so far as they extend to definite matters, considered property which may have value or not, depending upon whether the business authorized is profitable or unprofitable. The modern conception is that its sole function is to serve the public and that it is entitled to a revenue sufficient for operation, maintenance, renewals and an adequate return on the capital invested, which carries with it governmental regulation of rates and control as to the character of the service rendered. The franchise under which it operates being indeterminate, and hence not property in the older meaning of the term.

If the modern conception had even partially prevailed a generation ago, and a joint responsibility had been established between the public and private agencies that brought public utilities into being, the franchises providing that at the expiration of the contracts the utilities should be taken over by the public authorities at a price equal to the actual amount of the investment without depreciation, or that the franchise should be renewed, the complications now experienced in the valuation of such utilities would scarcely have arisen. If this had been done, courts would not have rendered decisions insisting that the rates charged by public service corporations must be reasonable, but giving us no clue as to how the reasonableness of rates can be determined.

Nor would they have traversed a circle, first making the value of public utilities dependent upon rates of income, and second, making the rates dependent upon the value of the utilities.

On the other hand, they would have held that any scale of rates, equitably distributed, that is necessary to secure good service is reasonable. It would have been held that proper service is essential and paramount and that it must be paid for, whatever its necessary cost, or that if the necessary cost could not be borne by the people of the community served, that they should go without such service until it should be borne.

The failure to do this has forced the adoption of the only alternative, where no franchise value exists, viz: the present reproduction cost of the structural property with depreciation and the value of the potential earning power as the ultimate basis of value.

This situation was presented in the Kansas City Water Works case, where the franchise no longer existed, and the company was under contract to sell and the city to buy or to renew the contract.

Out of this case thus presented, grew the conception of the element now known as "going value," though then referred to by the Court as the "additional value created by the fact of many connections with buildings, with actual supply and actual earnings." The value of the property, it was held, was "not merely the value of a system which might be made to earn, but that of a system which does earn."

The term "going value" does not appear to have been used by the Court or anyone connected with the case. The Court referred to the system as a "living and going business," and at least one of the attorneys for the company in his brief, speaks of it as a "going concern."

Judge Brewer's decision in this case was made in July, 1894, and in January, 1895, the commissioners appointed to determine the value of the property of the Newburyport Water Company, reported to the Court that they find that the plant was a "going concern" and that it had a greater value than if it had not been in operation, and that its value was enhanced $40,000 by reason thereof. The Supreme Court of Massachusetts sustained this finding in a decision rendered in June, 1907. The term "going value" does not seem to have been used in this case.

In April, 1897, Mr. Wynkoop Kiersted presented to the American Society of Civil Engineers an able and exhaustive paper on the "Valuation of Water Works Property," which was extensively discussed by twenty members of the Society. In all the one hundred pages of Mr. Kiersted's paper and the discussion, the words "going value" are not used, nor has the writer been able to find any expression indicating that the conception of "going value" as set forth in Mr. Alvord's paper, existed in the minds of any of those who participated in the discussion.

The author of the paper, Mr. Kiersted, contends for an appraisement of the "value of a plant and its business as a whole upon a fair and equitable basis," but the method favored by him though it made the business considerations of equal importance with the present physical value, anticipated that the business element was to be determined by some method of capitalizing net earnings, and modifying the same by engineering considerations. In summing up, after considering all the discussions of his paper, Mr. Kiersted holds to the view that "still there remains very substantial ground to believe that net earnings constitute the true basis of appraisement when proper deductions are made from the valuation so determined in accordance with the character of service rendered and the physical condition of the property."

DUBUQUE APPRAISEMENT.

The Board of Arbitrators in the Dubuque case, chosen early in April, 1899, consisted of five members, the writer being the only one of the five who had had an engineering training, or who had had any experience in the valuation of public utilities.

Mr. Kiersted's paper had engaged his earnest attention, and the principles of the Kansas City decision were understood in a general way, but not with sufficient thoroughness to base an important valuation upon. Realizing the insufficiency of his grasp of the principles underlying the Kansas City decision, the writer obtained the full record in the case from the clerk of the Court at St. Louis, upon which the case had been appealed from the District Court to the United States Circuit Court of Appeals, with the briefs of the attorneys accompanying the appeal, and made a careful study of the same, abstracting the most important matters contained in the record, and in the attorney's briefs.

Growing out of this he made an application of the principles of that decision to the Dubuque plant which is set forth in an opinion filed by him and which was printed in the "Proceedings and Findings of the Board of Arbitration." In this opinion a conception of "going value" was promulgated and the principles and method which it was believed should be followed in determining it, were set forth in detail.

For the sake of historical accuracy, in tracing the step-by-step development of the conception of "going value," the writer believes that the publication of portions of the opinion referred to, and a portion of one filed in the same case by John N. Baldwin, a very able attorney of Council Bluffs, who as one of the board of arbitration was intimately associated with the writer at that time, will be of interest. These extracts are hence submitted as an appendix, which by way of reference, is necessary to this discussion.

RETROSPECTIVE REVIEW OF THE DUBUQUE CASE.

In the ten years that have intervened since the writer endeavored to make clear the conception of going value, embodied in the Dubuque opinion, and since drawing the first diagram by the aid of which computations for going value were made, the method there outlined has been used in numerous cases by himself and others.

At that time the computation was, of necessity, based entirely upon the record made by the Dubuque plant during its operation, but the accumulated data since obtained from the operation of other plants, serves to establish the correctness of the general method then outlined upon solid grounds. Such being the case it is not surprising that there were oversights made at Dubuque and that additions to, and modification of the elements entering into the computations should be made. Ten years' experience has led to the following changes in the table for the computation of going value, as used at Dubuque, given in the appendix.

1. On the debit side should be entered the difference of operating expenses from the beginning of the period of construction to the time of equal revenue;
2. Interest on the original or operating plant for the construction period of the substitute plant.

3. A depreciation or renewal fund for the operating plant covering the construction period of the substitute plant.

A complete statement of all the elements required to compute going value, are as follows:

Credits.

1. Estimated domestic earnings for original plant;
2. Hydrant rental during the construction period;

Debits.

1. Estimated domestic earning of substitute plant;
2. Difference of operating expenses;
3. Interest on the original plant for the construction period;
4. Depreciation or renewal fund for the original plant for construction period.

The annual going value obtained from these elements should be reduced to present worth on the basis of compound interest, instead of simple interest, and the per cent used should be the highest allowable as income on capital invested in public utilities. This tends to conservatism.

The writer is unable to agree with the views taken by Mr. Alvord in his paper, regarding some of these elements.

Interest.

The author's treatment of the interest question during the construction period, in the main agrees with correct practice. In the appraisement of an existing plant, interest during its construction should always be made a part of its cost, that is of the investment, and in estimating the cost of a proposed new plant, the same course should be followed.

But during the period allowed for the construction of the hypothetical plant under consideration, the original plant, or the one being valued, is in operation, and the capital which it represents is drawing interest as an investment. This interest should enter into going value computations as it is wholly unlike the interest which accrues during the construction of the plant itself and which has become a part of its capital.

There is nothing analogous to interest on investment running against the hypothetical plant during the period of its construction. All interest is being merged in its capital, and appears as an investment as stated. The plant is not in operation and the investors are drawing no returns. There is hence no interest to stand against it that affects going value. At the close of the construction period of the hypothetical plant, the investment in each plant is equal and the interest thereafter should be neglected.

Hence the author is right that proper practice excludes interest during the construction of each plant from the going value computation, but the interest on the capital of the operating plant during the construction period of the hypothetical plant, should not be excluded, but should appear as a debit in the going value computation.

Depreciation.

With the proper lives and ages assigned, the annual depreciation fund will be the same for each plant, and as depreciation runs on the going plant for the period of construction, and does not appear for the hypothetical plant until it has gone into operation, depreciation certainly should be entered on the debit side for the construction period. After the construction period, depreciation being equal for each plant, it can be ignored.

Public Income.

Hydrant rental, is clearly a credit during the construction period. The going plant is furnishing fire protection for this time, but the other one is not. By the hypothesis, following the construction period the plant will have equal efficiency for the extinguishment of fires, and hydrant rental should hence be ignored thereafter.

Construction Period.

That the going value runs during the hypothetical construction period must be apparent; otherwise, it could not run through any period. The comparison must be between a going plant that never ceases operation, and hence has continuous earning, and a hypothetical one which must have time to be built, as well as time to acquire business. Requisite time for building is just as essential as the requisite time for acquiring business. The holding of any court that the construction period should be ignored because it does not cause money to be necessarily expended by the starting plant can only be due to a misconception of what going value is, and of what it is not.

What is Going Value?

This brings us to the fundamental question, What is going value? And how should it be defined?

The definition of going value given by the author that it is "the value of a created income," is an admirable one, which being the case precludes the idea that "*it is the cost of reproducing a given income.*"

In the conception of the writer the two statements are incompatible with one another. It is impossible to see how the *cost* of creating, or reproducing a given income, can measure its value. Though a fundamental error it is not uncommon to conceive of going value as the cost of building up the business of the public utility, and that it is to be measured by direct outlays made in so doing, and by the interest paid out while it is being done.

Some have advocated measuring going value by the deficit which a plant may have suffered over a term of years, without considering that you cannot create value by a deficit. That the cost of producing a given income, or revenue cannot be a measure of its value, after it is produced, becomes apparent when we consider that any given revenue must be expressed in dollars, as say, $10,000. Should it cost $20,000 to produce $10,000 of revenue, this fact would not turn $10,000 into $20,000.

On the same principle, going value cannot be measured by the expenditure necessary to build up a given business during the years that are passed, but it may, and must be measured by the difference between the revenue which a going plant will produce, and that which a substitute plant can produce in the future.

The diagrams and tables of the going value elements which the author uses to compute the amount of going value are all drawn, and arranged, by setting the earning of the going plant as modified by operating expenses, against the estimated earnings of the hypothetical plant modified in the same manner, and the difference of these he properly calls going value. How then can we conceive of going value being the cost of reproducing a given income, when the author's practice is to the contrary? Either the method of computing going value must be abandoned or the author's conception of going value must be amended, practice should conform to theory.

Mr. Leonard Metcalf in his paper on "Water Works Valuation, etc." presented at the meeting of the American Society of Civil Engineers, December, 1908, falls into the same error.

He says "going concern value may be defined as the cost of establishing , up to the level of the net income of the old plant, at the date of taking, the business of a similar new plant; or, to put the same thing in another way, it is the measure of the greater value (at the date of taking), of an old established plant over a similar new plant complete and ready for operation upon the date of taking."

These two definitions seem antagonistic. The cost spoken of in the first one, cannot be the greater value of the old established plant spoken of in the second one. How is one to know that there is a greater value in the business of the old plant without finding the difference between the results of operating each plant separately during the period of comparison? Why bring in "*a similar new plant*" if not for the purpose of comparing its predicated operations with the operations of the original plant.

If Mr. Metcalf is right that the "established business" element of value "depends directly upon the net income or earning capacity of the works at the date of taking," and if the "similar new plant" has no bearing thereon, it is hard to tell the function of the latter.

Mr. Metcalf's second definition would be correct, in the understanding of the writer, if he had not assumed that the new plant should be complete and ready for operation upon the date of taking the old one. Why, if this assumption is permissible, should he not assume that the new plant is not only complete and ready for operation, but that it has acquired the full business of the old one at the time of taking? One assumption is no more violent than the other, and by making the assumption complete, going value would be eliminated entirely.

Other Definitions of Going Value.

In the extracts from the Dubuque opinion in the appendix will be found, so far as the writer knows, the first effort to give a comprehensive definition to going value.

Since that definition was given, the writer has frequently found it desirable to formulate other and perhaps briefer definitions, for the purpose of appealing to other minds, from varying standpoints.

One such definition formulated by the writer is:

> Going value is the potential business value, the amount of which must be determined by the net income which a plant in operation can produce, in excess of that which a substitute plant of like character can produce, the construction of which is begun at the time of valuation; the annual excess income being reduced to present worth.

In the farther effort to make clear to other minds, that going value as conceived of and defined is not the same as franchise value, and that it of necessity attaches to all public utilities plants, whether there is a franchise to be valued or not, the following more comprehensive statement of the writer's is presented:

> Going value is inherent in the plant, and is a part of it just as truly as the cost of machinery and pipes is a part.
>
> While it has no existence without earnings, it is not necessary that the earnings shall equal expenses to give it a status. In other words, a plant may be losing money and still have a going value. This apparent paradox arises from the fact that it is the difference of earnings between the plant being valued and a hypothetical substitute plant, supposed to start with the same surroundings and conditions, under which the plant to be valued operates, but with the field clear and unoccupied, which constitutes going value. As long as the earnings of the substitute plant are less than those of the plant under valuation, the latter will have a going value. When the acquired business of the two plants becomes equal, going value ceases. Thus, while going value on one side depends upon the earnings of the plant being valued, it is dependent on the other side upon the rate at which it would be possible for a new, or substitute plant, to acquire business in the same, though a clear field, beginning with the time the valuation takes place. In other words, it is the difference in earnings of the plant in question, and the probable earnings of a substitute plant, with all its business to acquire, between the time of valuation and that time in the future when their revenues are supposed to become equal, that constitutes and measures going value.
>
> Franchise value is distinct from going value. It is dependent upon the right to operate or upon the right to the proceeds of operation, and upon profits.

Though going value presupposes a continuation of operation, it is no more dependent upon such continuation than is the value of the physical plant.

When a plant ceases to operate it becomes junk, and its structural value dies with its going value. They live and die together.

Though the present owner of a plant may lose his right to operate, the purchaser who has the right will profit from the accrued business as surely as from the business acquired under his own ownership. The accrued business is the creation of the former owner, and is vested in the plant at the time of transfer, and that portion of this accrued business, which is in excess of what the purchaser can create, with the same or a like plant starting without any business, is the going value. The seller has as much right to this, though the franchise may be dead to him, as he has to the physical value. There is no more justification in taking it from him without compensation than in taking the plant itself without paying therefor.

In case a purchaser takes over a plant under a limited franchise running to himself, having paid therefor the physical value plus the going value, and continues to operate it to the end of the franchise period, the total earnings growing out of the accrued business, and that which he may acquire, after paying interest, operation expenses, and depreciation, less the going value, in other words the profits, is the value of the franchise.

On the expiration of the franchise period, that portion of the total business which has accrued which would be in excess of what a second purchaser can create starting new with a like plant, is again the going value, which, if the plant and business have grown, will be greater than before.

In this case the value of the franchise accrues to the owner under his own operation, but when the owner is forced to sell, having a right to the value of the franchise for a term of years beyond the time of sale, he becomes the beneficiary of the franchise without the right to operate.

It is thus seen that cases may arise where the seller is entitled to a price much in excess of the structural value of the plant, without having a right to operate. He may have the right to the proceeds of a franchise, but he must part with it for a consideration, and this consideration is due because of what the plant will earn after it passes out of his hands. The owner's right to this franchise value cannot be inhibited, because it is a draft upon the future, neither can going value be consistently inhibited, because it must be determined by what the plant can yield in the future as a result of the business which is the creation of the past.

In the first case the profits of future earnings are realized without a continuation of operation in the hands of the beneficiary, while in the latter case the beneficiary merely recovers for the most part his past outlays, made to create business for the future. These cases are alike in another respect; in each the owner is forced to sell and the franchise is dead to him.

It is obvious from the foregoing discussion, that in making an appraisement of the property of a public service corporation, there is a fundamental difference between an allowance for going value, and an allowance for franchise value, if either or both should be made. The first is what is shown to be due in a general rounding up of past accounts, a closing of the books to date, while the second is a draft on the future, made wholly in anticipation of subsequent profits, the first involves the outcome of operations that are past, while the second involves earnings to accrue as the outcome of operations in the future. Going value is always to be considered an element for valuation, while the consideration of franchise value depends upon the character of the contract.

It is to be observed that the foregoing statement is predicated upon the modern conception of a public utility, that it has a continuing existence, and never ceases to operate. It may change hands at stated periods, but it is always the same entity, carrying with it at each and any change the reproduction constructural value, and the accumulated business value. They cannot be separated. Franchise value may be wiped out by a word in the grant, or by fixing rates so there are no profits, all the earnings being absorbed in fixed charges, operation and maintenance, but the going value remains. It may fluctuate in amount owing to varying conditions under which the plant operates, but it is always there and can be determined as the writer believes, with an approximation to accuracy that will compare favorably to estimates of values for the physical plant.

The writer has not infrequently seen two estimates for the physical value of a plant which varied over 100 per cent.

RELIABILITY OF GOING VALUE ESTIMATES.

It is easy to agree with the author that estimates of going value may be overworked, but it is just as true that they may be easily underworked. The same can be truthfully said of the reproduction cost of the structural plant.

One can as readily go astray in fixing the life of a plant, or of a specific part thereof, upon which depreciation is based, as in fixing the time when a going plant and a hypothetical plant will attain equal revenues.

To one familiar with construction, the period necessary therefor can be much more accurately determined in advance than can the life, or even the cost of many of the parts composing the plant. Life must be determined by experience with the plant under consideration, and by like experiences with similar plants elsewhere.

The assignment of future usefulness, of a given number of years to any part of a plant, may be just as conjectural as any of the determinations and assumptions, required in the process of computing going value.

The author gives a number of cases in the computation of going value, some of the elements for which differ widely from the writer's experiences.

Diagram No. 2 is for a city of 25,802 inhabitants, the domestic revenue of the plant is about $68,000, and the going value $68,614. To reach this level the hypothetical plant must gain a domestic revenue of $35,000 in one year, which is at the rate of one dollar per capita in less than nine months.

Diagram No. 6, population 6,072. Domestic revenue $11,500, going value $8,961, giving one dollar per capita acquired by the hypothetical plant in one year.

Diagram No. 14, population 36,252. Domestic revenue $76,000. Going value $149,829, one dollar per capita acquired by the hypothetical plant in less than one year.

A comparison of the time allowed by the author in the foregoing cases for the hypothetical plants to acquire a revenue of one dollar per capita, never more than one year, with the time required by experience in actual operation for the eleven cities given below, does not indicate much danger of extravagance in computing going value.

Table showing the time required for Water Work plants in the eleven cities given, to acquire one dollar per capita of domestic revenue.

	Domestic revenue in dollars and population.	Years to acquire one dollar per capita.
Appleton, Wis.	16,700	21
Eau Claire, Wis.	18,000	15
Sheboygan, Wis.	20,000	6
Galena, Kansas.	4,700	8
Hornelsville, N. Y.	11,000	8
Flint, Michigan	10,200	8
Dubuque, Iowa	36,300	29
Beloit, Wis.	9,000	12
Ludington, Michigan	8,000	10
Warren, Ohio	7,200	7.5
Salina, Kansas	5,500	12

It should be said with reference to Dubuque, that for the first eighteen years of the 29 year period the water supply was inadequate in quantity, and a large part of the city was not covered by the distribution mains. At least $22,000 of the $36,300 revenue was acquired in eleven years immediately preceding the year 1900, and after a general increase in the water supply had been made.

A separate analysis of the various elements that enter into a going value computation will bring to light the liability, if any, of overestimating, better than can be done any other way.

Credits

1. The estimate for domestic earnings of the going plant, for the period of attaining equal revenue, with the population of the city and the business growth of the plant for the past at hand, is a simple matter, and even a considerable variation from what will be realized affects the computations but slightly. Such an estimate is far more certain than any determination of the life of the physical plant can be.

2. Hydrant rental admits of no variation. It should be taken at the contract amount in force at the time of valuation.

Debits

1. Estimated domestic earnings of the substitute plant as usually determined, is more uncertain than any other element, and it is also the one which affects results the most profoundly. With the going plant the estimated earnings start with a known amount, and with the trend generally established by many years of past operation, and the city's growth in population. With the substitute plant initial earnings must be fixed in consideration of the probabilities in the case as indicated by the rapidity with which the old plant gained business, the character of the business, and with reference to the known experience of plants in other cities.

Though this element is the most influential, it is perhaps less likely to be estimated so as to produce an effect giving too large a going value determination than any other.

The reason for this will be understood by noting the time that it has taken water works plants to acquire one dollar of revenue per capita, as shown in the preceding table. Of the eleven cities listed, there are only two that have taken less than eight years to do so. It is rare that the revenue curve for a substitute plant is so drawn that it does not credit it with acquiring one dollar per capita in less than half of the time that was required for the going plant, and it is seldom that the period for acquiring equal revenue extends beyond eight or nine years, which is less than the time required by the going plant to acquire one dollar per capita.

As has been pointed out, the author has drawn the revenue curve for his substitute plants so that none of them are given more than one year for acquiring one dollar per capita.

2. Difference of operating expenses is important but much less so than the revenue of the substitute plant. In estimating it, one is more likely to make the difference too great rather than too small. The greater the difference, the less the going value, so that the chances are in favor of lower determination of going value, so far as the influence of this element extends.

3. Interest on the original plant for the construction period cannot go astray if the proper rate of interest is used, because the total interest debited will be proportioned to the length of the period.

4. The total depreciation fund will be proportioned to the construction period. The annual fund itself is determined in estimating the value of the physical structure, and if in error, it will affect the structural value to an extent as much greater than it affects the going value, as the unexpired life period of the going plant exceeds the construction period of the hypothetical plant.

The writer is convinced that the method of computing going value under consideration, when properly applied, gives results as to accuracy and reliability, that compare favorably with estimates for the reproduction structural value of the plant, and in the light of ten years' experience, during which time he has applied the method to numerous water works plants, and to a limited extent to gas and electrical plants, he believes that the going value determination is far less likely to exceed the true amount than the reproduction structural value.

Extravagant estimates on this line, as well as along all lines, are, of course, to be avoided.

The elemental values that enter into the total value of a plant should each stand on its merits, and if any modification is deemed advisable, it should be made in the general round up.

The writer has advocated this doctrine, in the valuation of public utilities for many years.

In an appraisement made nine years ago, where there was a question of water rights involved, in addition to the usual questions, it became evident that a general summary of the individual elements of value, each determined on its own merits, was greater than could be properly taken, as the value of the utility under the conditions as they existed.

The amount determined upon as the proper valuation was about 21 per cent less than the sum of all the elements of value. In reporting upon this fact, it was stated that the sum of the elements amounted to more than the utility was believed to be worth, considering the prospect of the city's growth, the condition of the distribution system, and the earning power of the plant, and particularly in view of the fact that about $100.000 should be expended upon the plant in the near future.

As stated in the report: "This scaling down does not imply that the methods followed in arriving at the individual elements are incorrect, or that the amounts found are excessive."

Also "From the foregoing statement of the case it will be seen that the proper appraisement of a water works plant consists of something more than the mere determination of the value and cost of the elements entering into such appraisement. All the physical property, the rights and franchises belonging to a water works company, must be considered in relation to the use to which they may be put; that is, to their environment. The failure to give proper weight to such elements in relation to these things often leads to erroneous results."

Reserved Right to Purchase

The author suggests one other consideration which may be used to modify going value, viz., the right often reserved by cities to purchase the plant at stated intervals, and that this right has a value. This suggestion brings us around to the starting point, the Kansas City case. There the city not only had the right to buy but it was obligated to buy. By Judge

Brewer's opinion this right was sufficiently important to eliminate all franchise value, but it had no influence on going value. The Kansas City case must be wiped out before the author's suggestion can be properly followed.

APPENDIX

Extract from the Opinion of John N. Baldwin, In the Dubuque Water Works Appraisment.

VALUATION OF THE OLD WORKS AS A "GOING CONCERN."

I have referred to the rule which fixes the allowance of the additional value over and above the cost of reproduction of the plant as a "going concern." There is no question about the rule, but there is always difficulty in making its application.

All the parties to this controversy concede that there is a value, some value at least, to be put upon the old property for this feature of its worth.

* * * *

While the rule and the reasons for the rule are easily understood and appreciated from either a business, a professional or a legal point of view, the application of the rule is a difficult task. It involves the investigation of these matters from an engineering standpoint. I confess to both a lack of information and of thought upon this subject until I had heard this testimony. Since that time I have studied the views of the different experts and the elements that they have taken into consideration in forming a valuation. I have also studied the analysis of these factors made by my associate, Mr. Williams. It seems to me that this analysis is correct, and I believe that it will also impress any one who will investigate and study it in the same way, and as I believe it is the correct opinion I adopt the same and have considered it in making up my judgment as to the value of this property. This statement is so satisfactory, so cogent in reason and so unanswerable in logic that I most heartily approve of the same and adopt it as a part of my opinion in this case.

It will be observed that no fact or factor enters into the opinion of Mr. Williams that is not found in this record. The difference in the results he obtains and those of the other experts is entirely due to the method of assignment and arrangement of the same facts and factors.

I find the "going value" of this plant to be $147,218.00.

Extracts from the Opinion of Benezette Williams.

(3) "GOING VALUE."

This subject presents a problem wholly different from the problems met under the headings 1 and 2, and the methods to be pursued in arriving at what we believe is, and should be, the correct amount to be allowed for "going value" is of an entirely different character.

The engineers who testified to the value of the plant estimated "going value" as follows:

John W. Alvord	$151,330.00
John W. Hill	106,000.00
J. T. Fanning	137,296.00
D. W. Mead	144,600.00
G. H. Benzenberg	131,138.00
Wynkoop Kiersted and Chas. P. Chase, for the city	62,718.00
Samuel Artingstall and W. S. MacHarg, for the city	49,500.00

It was early realized in the appraisement of water works plants, where the franchise had ceased, or where it was provided in the contract that the franchise should not be valued, that the problem of arriving at an appraisement which should be just to both parties, in view of the peculiar relations which water works companies hold to city corporations, was a difficult one.

To base a valuation upon the cost of construction was unsafe and was found inadmissable, at least in a majority of cases, both because present value cannot be very well determined from cost of construction, especially where the construction has run over a long term of years, and also because certain portions of plants are found to be, in very many instances, entirely abandoned, or rendered useless for the present and future, because of deterioration, or because of being superseded by better appliances.

Neither was the method of valuation by means of capitalizing the net earnings deemed admissible, both because it partook of the nature of valuing the franchise, and because it gives widely varying results, when applied to a plant at different periods of its existence.

The only method left seemed to be that of the cost of reproducing the useful portions of the plant, less the estimated deterioration due to wear and tear, and decay. It was soon realized that estimates confined to the cost of reproduction could not and did not, give a true value of the plant, and that the application of such a method would work great injustice to the owners of the plant, if rigidly made.

In the case of the National Water Works Company of New York vs. Kansas City, in the Circuit Court of the United States for the Western District of Missouri, and which was appealed to the U. S. Circuit Court of Appeals, Eighth Circuit, (to be found in U. S. Fed. Rep., 62,853) the question of the value which attaches to a water works plant because of its being a "going concern," in use, and earning, was brought to a clear-cut issue, and decided as being properly a part of the value of the plant, which should be added to the cost of reproduction.

The Kansas City case is of special value in this one, because it presents the findings of two courts where the same issues had been raised that were raised here, and under almost exactly parallel circumstances, so far as relates to the application of the principles involved. That is, in the Kansas City case, the works had been in operation twenty years, and by the terms of the contract as construed by the court, the city was compelled to purchase the works or renew the franchise for twenty years more.

In the Dubuque case, the works have been in operation something more than twenty years, and under this arbitration proceeding, if a price had been fixed, the city would either have had to take the works as valued by the Board of Arbitration, or leave the franchise in force until its expiration, about twenty-two years hence.

In the Kansas City case the city contended for a valuation which should be less than the mere cost of reproduction reduced by ordinary depreciation, it contended that the valuation should be still further reduced by reason of any faults of construction or incapacity. In opposition to this, the company contended that the works should be considered as a whole, not only the plant, but the business which the plant was doing; in other words that it should be considered as a property in operation, and with a given earning power—that is, a "going concern," and that in such condition it was worth much more than the mere cost of reproduction.

In this contention, the company was fully supported by the Court of Appeals. The place where the company failed, was in not presenting to the court some way of arriving at this operating, or "going" value, which struck the court as being consistent with the fact that the franchise value of the works could not be considered.

It undertook to determine the value of the whole property by a capitalization of the net earnings, and while, as was clearly shown by Mr. Gardiner Lathrop, one of the attorneys for the company, this method of valuation did not give the full value of the franchise for a succeeding period of twenty years, still they were unable to convince the court that such a method did not include franchise value.

The court held that the mere cost of reproducing the plant would not be a fair valuation "because it does not take into account the value which flows from the established connections between the pipes and the buildings of the city." And that "the cost of reproduction does not give the value of the property as it is today."

But though it thus clearly recognizes the existence of a value in excess of the cost of reproduction, it does not in terms define such value or lay down any general principles by which such value can be determined.

It, however, does establish the principle that in such cases the true valuation consists of two elements: First, the reproduction value, and second, the operating or "going value." Indeed, there is no logical escape from the conclusion that the value of a plant where the franchise is not involved does consist of these two elements. It is futile to attempt to establish a method of valuation which does not take into consideration the present reproduction value of a plant, and since this reproduction value does not represent the whole value, there must be added to it that increment due to its potential earning power, which has been aptly termed "going value," or "accumulated value."

The first element, the reproduction value, presents something tangible to the ordinary mind. It can be estimated by men familiar with the cost of constructing works. However much they may differ with regard to this cost, and in regard to the deductions which should be made for depreciation, the problem still remains within the domain of the tangible.

The second element, heretofore, has not been clearly defined in the minds of those having to deal with such questions, if we are to judge from the Kansas City case, and the discussion of Mr. Kiersted's paper on Water Works Valuation, published in the December, 1897, number of the Proceedings of the American Society of Civil Engineers.

Generally, when the problem of measuring "going value" has been considered, the matter of interest during construction, and until the earnings of the new works equals the cost of operation, has been suggested as the unit or basis of measurement.

This is well illustrated by Mr. Robert Moore's discussion of Mr. Kiersted's paper. Mr. Moore and Mr. James Andrews, of Pittsburgh, Pa., had been appointed commissioners in the Kansas City case to "Make a personal inspection, examination and reasonable test or tests of the system of water works which supplies the city and adjacent territory with water, and to estimate and fix the value of said works and system as a whole." They had returned to the court an estimate of $2,546,112 as the value of the works, including the Kaw Point pumping station.

In the discussion of Mr. Kiersted's paper, Mr. Moore says:

"The commissioners for the appraisal of the Kansas City Water Works, of whom the writer was one, reached a valuation of $2,546,112 by estimating, as well as they could under the circumstances, the cost of replacing the plant by another in all respects equally as efficient." "As applied to real estate occupied by the works, this estimate gave an amount much greater than first cost. As applied to buildings, pipes and machinery, this method gave an amount which was no doubt much less than first cost. The commissioners, however, took into account the fact that the plant was in actual operation, with an established business and a long list of patrons, and added to the cost of replacement, which included a liberal allowance for contingencies, an allowance for interest on the investment for a time long enough to enable the business to reach the point at which it was found." * * * * "The one thing to be valued was, the property in working order, with the private attachments all made and the body of patrons ready to take water. The value of all this was the amount of money it would have cost the city at the time of the transfer to replace the property in the same condition in which it was actually found."

"The problem of valuation in this and like cases involves therefore, as already intimated, the summations of the following elements:

(1) A valuation of the real estate owned and occupied.

(2) An estimate of the amount of money necessary to replace the plant, including buildings, reservoirs, machinery, pipes, etc., in its present physical condition, exclusive of interest.

(3) The interest on this amount during the time which would ordinarily and reasonably be required for construction.

(4) A further allowance of interest for such additional time as would probably be required to work up the business to the same standard as that found at the time of the transfer."

Here Mr. Moore makes "going value" to consist entirely of the matter of interest upon the money necessary to replace the plant, counted on the investment during the time of construction, and during the time that would be required to work up the business to the standard found at the time of transfer. This method gives no consideration to the accumulated business of the works. It is purely a matter of "interest" on the investment for a certain time, and for such reason cannot and does not represent "going value."

Such an allowance has reference to new works rather than to old; "going value" must attach to the old and not to the new.

Before entering upon an analysis of the evidence relative to "going value", we will consider—

First, and in a more extended form, the underlying principles which justify the addition of such a value to the cost of reproduction.

Second, determine some method, if possible, by which such value can be measured and estimated in a logical and consistent manner, which will be generally applicable in such cases, thereby establishing a standard by which to test the several results obtained by the engineers in this case, as well as to furnish a test for general application.

Third, the definition of "going value."

Principles which justify the addition of "going value" to the cost of reproduction.

The principle established in the case of the National Water Works Company vs. Kansas City, 62 Fed. Rep., 853, and 27 L. R. A. 827, is held to be obligatory in all similar cases.

The court says that it is not satisfied that either the method proposed by the city or that proposed by the company would, under all the circumstances, give "the fair and equitable value." "Capitalization of the earnings will not, because that implies a continuance of earnings, and a continuance of earnings rest upon the franchise to operate the works. The original cost of the construction cannot control, for original cost and present value are not equivalent terms. Nor would the mere cost of reproducing the water works plant be a fair test, because that does not take into consideration the value which flows from the established connection between pipes and the buildings of the city." * * * *

"The fact that it is a system in operation, not only with a capacity to supply the city, but actually supplying many buildings in the city; not only with a capacity to earn, but actually earning, makes it true that a fair and equitable value is something in excess of the cost of reproduction."

The court further says: "That a system without a single connection between the pipes in the streets and the buildings 'would be a dead structure rather than a living and "going" business.' The additional value created by the fact of many connections with buildings, with actual supply and actual earnings, is not represented by the mere cost of making such connections; such connections are not compelled, but depend upon the will of the property owners and are secured only by the efforts upon the part of the owners of the water works and inducements held out therefor."

* * * *

"If it (the city) steps into possession of the property that not only has the ability to earn but is in fact earning, it should pay therefor not only the value of a system which might be made to earn, but that of a system which does earn."

The court further says, taking into consideration all of the transactions between the city and the company, and the connections already made between the pipes and the buildings, that "We have sought to place a value upon the property as it stands."

In the case of the Newburyport Water Company vs. City of Newburyport (47 N. E. Rep., 533) the Supreme Court of Massachusetts refused to open up the judgment of the lower court confirming an allowance of commissioners of $40,000 for "going concern" value, in fixing the value of the Newburyport water plant, which the city had taken from the company.

The conclusions of these courts are believed to be eminently just. In the process of developing a system of water works from the beginning, there is a large expenditure incurred in the effort to get business. The plant is almost universally run at a loss in its earlier stages, and this expense has really been properly considered a part of the investment, because it has been paid out of the earnings of the plant which would otherwise have gone to pay for the use of the capital.

Mr. Kiersted brings out this fact clearly in the course of his paper before referred to. He says: "The cost of a plant is the amount expended in constructing and establishing it." He also shows that there is a risk attending the building of a successful water works plant. That it is impossible to anticipate the direction of the growth and the magnitude of the expansion of the property. That developments of the city create new conditions, which compel the selection of a new source of water supply and the modification of plans which had previously controlled. Such enforced changes, he holds, are often wholly unanticipated and entail heavy expenditures without increasing revenue, and may often require the abandonment of portions of existing works. This hazard, he thinks, should be considered in the valuation of water works property in its entirety.

He says, "Such losses, together with interest paid upon money, expended during the interval of the construction of the works, are considered by the investor as a part of his invested capital, and an item of original cost of construction."

He also concludes that such outlays "Constitute a legitimate expense, which anybody, city, company or individual, building up a business of water purveyor must incur, *and for which there should be, in some manner, a resulting compensation.*"

He holds that "It is clear that the original cost, or the bare cost of duplicating water works property, is not, of itself, the measure of the value of that property. Its present value embraces both the value of the plant and the business resulting from the use of the plant; together they constitute a single commodity, therefore in an appraisement of value of the water works company, it is the commodity which is appraised and not the materials of construction."

These general principles, so well expressed by Mr. Kiersted, are in full harmony with the judgment of the United States Court of Appeals in the Kansas City case, and as is here contended, furnish the underlying principles which justify the addition of a "going value" to the cost of reproduction.

METHOD BY WHICH "GOING VALUE" CAN BE MEASURED AND ESTIMATED.

If, on a given date, a city such as Dubuque should purchase a water works plant already in operation, and earning a large and growing sum, it would, between the date of purchase and any given time in the future, receive the increasing revenue which such works are capable of earning during that period. This revenue would consist not only of that derived from private water takers, but also it would include the hydrant rental value. During this period, it would pay out the interest on the cost of the investment, plus the cost of operation.

If, however, the city, instead of purchasing a plant in operation, with a large revenue, should at the given date of purchase enter upon the construction of an entirely new plant, the city having been without a plant up to the time of purchase, it would, for the period of construction, extending from the beginning of construction to its end, derive no revenue of any kind whatsoever. But beginning with its final installation the plant would have to its credit the same value for hydrant rental that the old plant would have, and would continue the same value to the end of the given period. On the other hand, the revenue from private sources at the time of installation would be nothing, but the revenue from that time to the time when the two plants would have an equal revenue, would constantly and with substantial regularity increase until it attained an amount equal to the revenue of the old plant.

During this period, extending from the beginning of construction till the revenue of the two plants become equal, the maintenance outlay on account of the new plant would consist of interest on the investment during all but a small part of the time. The operating expenses, however, would not begin until the completion of construction and the final installation of the plant, and from that time on to the end of the period, would continue without intermission. The amount of operating expenses after installation would, in respect to the amount of fuel used, be less at the beginning than they would be for the old plant during the corresponding time. There would, however, be during this period when the cost of fuel would be less, a corresponding increase of other expenses due to the matter of obtaining business, which would not belong to an old plant to the same extent. It is therefore believed that after installation the cost of maintenance of the new plant would equal the cost of maintenance of the old plant. This view is strengthened by Mr. Kiersted (Evidence 415), when he says: "The advantage of purchasing an organized property lies in the fact that the purchaser is thereby enabled to carry on the business of water purveyor without the expense attending the early organization and development of the business."

To get the total relative operating value of two such plants from the period of purchase, or the beginning of construction, till the time when their revenues would be equal, we would, dropping those factors which correspond in the two plants, have to consider only the following ones:

On the credit side would be:

(*a*) The earnings from private sources from the old plant during the whole period.

(*b*) The earnings from hydrant rental during the period of construction.

On the debit side would be:

(*a*) Difference in interest paid during the early part of construction.

(*b*) The cost of operating the old plant during the time of construction; and,

(*c*) The revenues derived from the new plant between the time of installation and the end of the period.

If the difference of the sum of the elements on the credit side, and the sum of the elements on the debit side, be taken for corresponding years, and these yearly differences be reduced to their value at the time of purchase, the sum would represent correctly the real value of the old plant, due to its being a plant in operation, over the value of a new plant, the construction of which was entered upon at the date of purchase of the old.

The following is given as a general definition of "Going Value."

"Going value" consists of the element of earning power which a plant possesses, growing out of it having an assured business in excess of what a new plant starting without any business would have, and it is measured by the sum of the yearly amounts of revenue, reduced to present value, which such plant in operation will produce in excess of what new works of a like character can be made to produce, between the time of purchase and that time in the future when the revenue of the two works become equal; proper allowance being made for differences in cost of maintenance."

Though the above statement of what properly constitutes "going value" is believed to be logically correct, it is conceded that there is liable to be much variation in applying the theory practically. There will be differences of opinion as to how long it will take new works, after their installation, to obtain a revenue equal to the revenue which old works would have attained at a given time. There are also other matters about which differences of opinion may obtain, but the fact that such differences may be presented, does not militate against the value of a clear and correct theory of obtaining "going value."

In an appraisement, differences exist about the simplest things entering into such appraisements. This fact, however, does not relieve appraisers of the obligations resting upon them to determine the various elements of value with their best ability, in accordance with the most consistent theory and the best established facts.

* * * * * * * * *

REVISED ESTIMATE OF "GOING VALUE."

In Dubuque the "going value" should be determined by what new works of like capacity would accomplish during the period considered, beginning in a city of the present size, but which had had no water works, and in which all the inhabitants were provided with the usual domestic methods of getting water, compared with what the old works would accomplish during the same period, that has been in operation twenty-eight years. With the new works, the acquirement of new business would be necessarily slow. It would take many years for people to abandon their old methods of supply and adopt the new. This fact is well established by a study of the revenue chart put in evidence by Mr. Alvord. It is also shown by the fact that today in the city of Dubuque, on the lines of the company's plants, not half of the houses take water from the works. The total number of houses on the lines of the pipe as shown by the affidavit of C. B. Burdick, introduced in evidence, is from 4,170 to 4,270, or say 4,200, while the total number of taps given is 1,760, leaving more than half the houses without connections.

Reference to the diagram shows that if a line representing the average domestic consumption of 1889 to 1899 be drawn, it will start in 1889 with earnings of $15,000, and that for the year ending March 1st, 1899, it shows earnings of $35,000, a gain in ten years of $20,000, or $2,000 per annum. This increase of earnings, as is seen, began with the installation of pumping works at Eighth street, and has continued without intermission to the present time. The previous fourteen years from 1875 to 1889 show a total increase of only $5,500 in domestic revenue, or but $393.00 per annum. This is due evidently to the inadequacy of the water supply, which came wholly from the "level," up to 1889. This supply being only 365,000 gallons a day, kept down the domestic service previous to 1889; but beginning with 1889, and especially since the establishment of the Eagle Point pumping station, the supply has been fairly adequate to the demand. The works are being enlarged to supply a greatly increased demand, and it is believed to be a conservative estimate to assume that during the next eight and one-half years following September 1st, 1899, the increase from domestic service will be fully as great as it was during the ten years previous to 1899; that is, $2,000 per annum. This gives total earnings from domestic service for the old works for the year ending March 1st, 1908, of $53,000.

In making this estimate, additional factors are used as follows:

The total time from the date of purchase, September 1, 1899, to March 1st, 1908, is eight and one-half years; two years of which is used in construction. Money is considered to be worth five per cent on water works investments. Hydrant rental for 1899 of $17,000 is assumed to continue through the years of construction—1900 and 1901. The operating expenses for old works during those two years is taken at $22,000 for each year. It is considered that on September 1st, 1901, new works would start with no earnings, and that in six and one-half years ending with March 1st, 1908, they would have earnings at the rate of $54,000 per annum from domestic service. It is also considered that during this period the expense of maintenance, which includes operating expenses and interest, would be equal for reasons hereinbefore stated. It is also considered that during the period of construction there would be a gain of one year's interest by the new works, or say five per cent on $500,000. A tabulation of the estimate which follows shows a total "going value" of $147,218.00, and is assumed to be correct in the determination made by us in this case.

Estimate of Going Value of Dubuque Water Works.

	CREDITS.			DEBITS.						
Year Ending Sept. 1st.	Domestic Earnings, Old Works.	Hydrant Rental, Old Works.	Total Credits.	Domestic Earnings, New Works.	Operating Expenses, Old Works.	Interest on Investment One Year.	Total Debits.	Annual Going Value.	Divisor.	Present Worth Going Value.
1900	$38,000	$17,000	$55,000		$22,000	$25,000	$47,000	$8,000	1.05	$7,620
1901	40,000	17,000	57,000		22,000		22,000	35,000	1.10	31,818
1902	42,000		42,000	$4,154			4,154	37,846	1.15	32,904
1903	44,000		44,000	12,463			12,463	31,537	1.20	26,275
1904	46,000		46,000	20,770			20,770	25,230	1.25	20,184
1905	48,000		48,000	29,078			29,078	18,922	1.30	14,555
1906	50,000		50,000	37,386			37,386	12,614	1.35	9,342
1907	52,000		52,000	45,694			45,694	6,326	1.40	4,520

Total Going Value $147,218

Mr. William H. Bryan (by letter): This paper is a notable contribution to the meagre literature available on appraisals, and is valuable both for the light thrown on an intricate subject, and for the straightforward exposition of the author's views. To present in an equally straightforward manner a somewhat different view, is the object of this discussion.

It is an unfortunate fact that agreement is still far from general among engineers both as to the proper definition of going value, and as to the correct method of fixing its value. This is well illustrated in the author's compilation of twenty valuations, in which it varies all the way from zero to 47 per cent of the physical value of the plant. Even wider ranges would probably be found if all the appraisals in which it has been considered by able engineers of varying viewpoints, could be compiled and compared. In one of the most important appraisals of recent years, in the hands of five of the leading specialists of the country, no two of them agreed as to the method of computation.

We should not lose courage, however, for there is much evidence indicating that substantial progress is being made towards clearer and fairer views. The writer ventures to indulge the hope that it may soon be possible to so handle this matter that the justice and fairness of our methods will be so apparent as to appeal not only to specialists—but to judges and juries and to mayors and boards of aldermen as well. There must surely be a way to so determine going value as to satisfy both seller and purchaser.

Perhaps the clearest official utterances thus far made on this subject are the recent decisions of the State Railway Commission of Wisconsin. In the Cashton Light and Power Company case they said:

> The element of "going value," created by the investments made in developing the business and in addition to the cost of the physical structure, must be taken into consideration in fixing value; although the franchise of a public utility operating under an indeterminate permit has expired upon the exercise by the municipality of its option to purchase, the plant is to be taken over as a going concern, and just compensation must be awarded for the property taken as a living and operating entity, engaged in serving the public, and not as a mere plant without patrons and without privilege or right to operate and to serve the public, and having but a salvage value.

Also in the Antigo water and the Marinette telephone cases:

> The theory of the Wisconsin public utilities law is that rates shall be reasonable and shall be not greater than enough to yield a fair return on the investment. In determining the investment as a preliminary process to the fixing of rates, the commission had to deal with the claims of large "intangible" franchise values as well as "going values" in both the Antigo water case and the Marinette telephone case. Regarding the former the commission holds that if the municipality required the payment of money or its equivalent, or there was necessary legitimate payment made for the franchise, then the sum which may reasonably be said to have been paid for the franchise may be included in the valuation the same as money necessarily invested in the physical property, But the commission refuses to consider the claims of some experts and corporations that franchises for which no money was paid may have "intangible" values which should be considered in the making of rates.
>
> It has been held by experts that "going value" should be allowed as

so much per customer or as a percentage of the receipts, and some have considered it of as great, if not greater, importance than the physical value of the plant. The commission holds that the actual reasonably wise expenditure of money towards getting the business of the plant established may be included in the value to be allowed for the purpose of fixing rates. Since no plant pays at the outset and the first years of operation are almost invariably accompanied by losses or necessary deficits, the commission holds that such losses may be said to represent the cost of securing an established or going business and as such may be included in the value or investment upon which the rates for public service shall be fixed. But the converse of the rule also holds—that is, if a plant has in the past earned more than a reasonable return, possibly through the toleration of excessive rates, the excess over reasonable earnings may under certain conditions be subtracted in determining the present value of the plant. That is, a "going value" may be negative. In the case of the Marinette Telephone Company, for example, the commission found upon its investigation of the financial history of the company, that through a period of recent years the company had been enjoying a sufficiently high rate of return to write off the early deficits in so far as such deficits might be allowed as going value.

It may be noted, in passing, that the now generally accepted view is that the plant value upon which a fair return must be earned is the present cost of duplicating the existing plant (less depreciation) and not its actual original cost. It is not material, therefore, what the original outlay for franchise may have been, but it *is* important to know what moneys—if any—would now have to be expended to secure such a franchise. Neither are past losses or profits conclusive, further than as they throw light upon probable future earnings.

The important facts in the above rulings are that the Wisconsin Commission has officially recognized the propriety of including going value in appraisals, and has pointed out that it should be computed as the sum of two outlays:

1. Moneys spent directly for getting business; and
2. Moneys advanced to cover losses in the earlier years of operation.

These amounts of course are not the sums which the existing plant may actually have expended, but the amounts a plant starting today would probably have to pay to secure sufficient business to make the plant self-supporting.

Having ascertained the present value of the physical plant, the commission considers it proper to add to it these two amounts,—the total being the fair value at which the plant might be sold, or upon which the owners are entitled to earn a fair return.

Assuming the existence of the bare physical plant—without connections or business—what additional outlay would be necessary, under the conditions existing at the time of the appraisal, to bring its income up to a point where its losses would cease, and it would begin to earn a fair return?

Legitimate expenditures to build up business would cover such items as advertising, circulars, solicitors, special rates, or even free water, for limited periods, free connections, plumbing at or below cost, etc. Not infrequently solicitors are paid a fixed sum per contract brought in. Such outlays would unquestionably hasten the attachment of services and thus shorten the unproductive period. It is proper to take into consideration the present-day general knowledge and appreciation of the advantages of water under pressure, and the fact that it is now a necessity in manufacturing, commercial and domestic life. In any modern city the demand would be immediate and extensive, and the rapidity of securing business would—in most cases—be limited only by the ability of the working forces to install the plumbing and make the connections. At starting the plant would have the public revenue from fire hydrants, public buildings, fountains, etc., and soon thereafter the income from a considerable number of private consumers. This would cover a large part of the operating expense—probably half, or more. It then remains for the appraiser to estimate the period within which the necessary volume of business would be connected, and to compute the probable losses up to that time. This is a matter calling for the trained judgment of a skilled observer. It depends upon the size of the city, the character and habits of the people, their wealth, the number of factories, breweries, railroads, etc., and the quality and quantity of other available supplies, such as wells and cisterns—and many other things.

The physical value of the existing plant is ascertained by estimating the cost of a duplicate plant and deducting depreciation, such cost including of course interest, administration, etc., during the construction period. Some engineers—among them the author—hold that as this duplicate plant could not be gotten into actual service for a considerable period, the net earnings of the existing plant during that period are properly a part of going value. The income of the existing plant being limited however to a "fair return," there would be no excess earnings, and therefore nothing to add. From this standpoint the city's right to purchase in no way affects going value.

The probable operating expense of the "starting plant" may be projected into the future with reasonable accuracy. It must of course include not only the ordinary expenditures for labor, fuel, supplies, etc., but also taxes, repairs, administration, interest, and depreciation. The growth of income, however, is not so easily estimated, as it involves both the volume of business, and the rates charged.

Income depends upon rates. A favorable schedule—not necessarily the highest—will shorten the unproductive period, and thus decrease going value. Unwise rates retard growth and increase going value. Attempts to determine going value must therefore presuppose some basis of rates. But rate revision—directly or indirectly—is the purpose of most appraisals. To assume rates as a step towards fixing rates is to reason in a circle. What then shall be done?

Many appraisers assume that existing rates continue. It is argued that they furnish the only definite data available affecting income. To change them would be to enter upon the problematical. But existing rates may be either too high or too low for a fair return.

The tentative or "cut and try" method would seem much preferable. First compute income and then going value, using existing rates. If that income is more than a fair return, repeat the calculations at a lower rate. If insufficient try a higher schedule. Continue these trials until a rate is found which will insure a fair return within a reasonable period. The going value on this schedule would seem to be the proper one.

Going value thus determined is clearly independent of whether the franchise has expired or whether the city has the right to purchase. It enters into the appraised value of the plant, just the same as any physical item—at its cost of reproduction.

It is interesting at this point to note the Wisconsin Commission's conclusion that going value may be negative, when later profits above a fair return have more than wiped out the deficits of the earlier years. Is not this a reasonable consideration for the future? Assuming a rate schedule and growth of business which would make the plant self-sustaining within a reasonable period, the normal continuation of that growth would cause the plant to earn profits which would soon offset the earlier losses, and thus destroy our measure of going value. It would be within the legitimate power of the authorities to so adjust rates as to bring this about.

Turning now to the paper under discussion, we find that the author defines the going value of an existing plant as the cost of reproducing the income of that plant. He fixes its amount by computing the difference between the net results of its operation and the net results of a well conducted "starting plant, through the time necessary to enable the starting plant to be completed and recover an income equal to that of the going plant."

The differences between the author's views, and those now officially promulgated by the Wisconsin Commission—which, by the way, are held by many able engineers—are worthy of serious consideration.

The first difference is one of definition—the author holding that the income, the cost of producing which is to be estimated, is the gross income of the existing plant. The commission's view is that an income sufficient to meet operating expenses is sufficient. Losses having ceased further business is secured without cost. Previous losses may properly be called going value and charged to capital account. A greater income is of no interest or value to the municipality, for rates will at once be readjusted to the "fair return" basis, whether the appraisal is for sale or rate fixing. No city could fairly be asked to pay an inflated "going value" based on an excessive income which it will immediately proceed to reduce. Existing income based on existing rates is therefore valueless for this purpose, and may even be misleading, as producing sometimes more—sometimes less—than a fair return. It would seem that the author himself has sometimes used this method—see his diagram No. 17.

Viewed from this standpoint the financial history of the existing plant has only an indirect interest. It may help us to estimate the cost of operation, and to form some judgment as to the time within which the starting plant will begin to earn a fair return.

The second difference between the author and the commission lies in the method of computation. Nowhere does the author recognize the direct expenditures for getting business already referred to. He compares the existing plant already doing business as a going concern, with a similar "conceptual" plant without business, which would have to be built and put into operation. Meanwhile the business of the existing plant continues its normal growth. He concedes, however, that at some future date the starting plant will acquire an income equal to that to which the existing plant has then grown. The difference in net operating results up to this date comprises—in the author's opinion—the full measure of going value.

Two perplexities here confront us. The existing plant with its prestige of years, its standing in the community, its "going value" if you please— would seem to have a permanent advantage. Having usually twenty or more years the start, ought not its continuing growth, to keep it permanently ahead of the newer plant? And if there is to be forever a difference in their income then the going value thus computed must be infinite.

If, however, the "starting plant" is assumed to grow at so rapid a rate that in a few years its income equals that of the existing plant, why should that rate of growth then suddenly drop to that of the existing plant? Will not the same conditions which have caused its previous rapid growth continue? If they do, thenceforward there would be an excess of income which would soon wipe out the earlier shortages, as has been well pointed out by the Wisconsin Commission.

A system of computing going value whose results may range all the way from zero to infinity, is not pleasant to contemplate. But these difficulties vanish when the "fair return" income—and not the existing income—is taken as the basis.

The author's method might fairly measure the increased worth of the existing system to a private purchaser as compared with a prospective plant without business—assuming a continuance of rates and income. But such assumption cannot be made in the case of municipalities (except where unexpired franchises exist) as the ultimate purpose of practically all investigations of this kind is rate revision. Furthermore, the *cost* of reproduction is the ruling condition—not the value of the thing reproduced, exactly as is the case with a pumping engine, or any other feature of the physical plant.

Many attempts have been made to compute going value along similar lines, although but few have followed the author's exact definitions. In some such comparisons interest and depreciation during the construction period have been assumed equal on the existing and starting plants, while they should not be charged against the starting plant at all. There is no depreciation prior to the start, and interest is always included in the construction account.

This, however, brings up another matter. As the author well says, it is not fair to substitute hindsight for foresight. No designer can foresee all possible contingencies—no engineer is infallible. Mistakes have always been made—and always will be. Boilers, engines, standpipes, buildings, reservoirs, purification systems—even sources of supply have failed, necessitating removal, and in some cases abandonment of entire plants. Sometimes the city has not grown in the direction originally expected. Even the most capable and experienced designers, associated with men of the soundest business judgment, have encountered such disasters. It is a hazard of the business. If a new plant were begun tomorrow either by private parties or the municipality—this risk, in greater or lesser degree, would necessarily inhere in it.

No fair-minded appraiser, however, would include allowance for such mistakes, however unavoidable. The city cannot fairly be asked to purchase at—or pay rates on—values so determined. But does not the fact that the existing plant has—as it were—"sown its wild oats"—has discarded its unwise and useless equipment, and has demonstrated the fitness of its remaining parts—make it of more value than a new plant with that unavoidable experience still to go through?

The writer confesses to some uncertainty as to just where this factor should appear, but that it is an element which should not be overlooked he is certain. For lack of a better place he suggests that it have its weight as one of the "contingencies" in fixing the percentage to be added to the cost of reproduction. In the average case, however, its value would not be large.

What should be the attitude of the conscientious appraiser toward those plants which are losing money? Has such a plant a going value?

This question has been answered in all seriousness in the affirmative. It has been held that an established plant would lose less money than one with its business still being developed. Under the author's method the excess in loss of the "starting" over the existing plant would measure the going value. The Wisconsin Commission plan could not of course be applied, as the continuing losses would make the going value unlimited. Under these circumstances there may be several views:

(1) A study of the situation may show that the normal growth of the business will soon end the losses.

(2) The losses may be decreased—and in due time ended—by some reasonable advance in rates. In both of these cases the Wisconsin rule could safely be applied.

(3) If, however, the situation is such that there appears to be no reasonable way to make the plant earn a fair return, the solution becomes complex.

Such cases unfortunately are not uncommon—particularly in smaller cities, and in undeveloped or boom territory. Sometimes both the city and the owners have been over-sanguine as to the future. Many cities have in times of enthusiasm and prosperity been induced by energetic promoters to enter into contracts for service which have later proved exceedingly unwise for all parties concerned. Business has not developed, nor has the place grown, as anticipated. Important industries may have ceased; opposition towns or railroads may have taken the business away.

While the plant is losing money at the existing rates, it is nearly always true that these rates—both public and private—are a serious strain on the limited resources of the city and its people. No advance is therefore possible—it may even be impossible to maintain existing rates. Not infrequently the expiration of the contract is looked forward to as a date when relief may be expected.

Such contracts are usually for periods of twenty to thirty years. Usually all obligations between the parties end with the expiration of the contract. There seems no escape from the conclusion that the owners of the plant must accept the situation as it then exists. As they would have been entitled to the profits of a successful plant, so also must they accept the losses of the unprofitable one. If the cost of service is beyond its means the city is at liberty to discontinue it. If the contract made no provision for extensions—or if such provisions were illegal—the plant has no right superior to those of the municipality. It is to be presumed that the owners knowingly took the risk of securing, within the contract period, such returns as were necessary.

This view is of course hard on the invested capital but the law very wisely prohibits municipalities from incurring obligations which may prove onerous to future generations. Posterity should not be made to suffer through the errors of earlier days. In some cases it has been held that owing to the uncertainties attending the situation at the end of the contract, the "fair return" basis entitled the owners to rates which would make the earnings sufficient to retire the entire investment—less scrap value—within the contract period. This interpretation, however, is very rare. It has a counterpart in those states which require the establishment of sinking funds by municipally owned plants to retire the bond issue within a definite period, usually much less than the life of the plant.

The problem then is—not whether a going value should be included in the value of the plant—but to determine a value which the maximum income possible under the existing circumstances will support. In other words, the actual worth of the service to the community fixes a limit to the value of the plant, beyond which no figures however elaborate or logical can go.

Under a strict interpretation of either the Alvord or the Wisconsin theory, the city would be required to purchase the plant at a valuation—or pay rates giving a fair return on a valuation—based on cost of duplication less depreciation plus going value. The latter on account of the slow building up of the business, would be large.

Clearly, however, this would be unfair to the city, as involving prohibitory rates—rates which the public service could not stand, and which would discourage private consumption and prohibit growth, thus minimizing private revenue. The difference could not be made up by increased taxation as this is limited by law.

We may of course take the broad stand that if a city wants water works it must pay the price—they cannot be run as charitable institutions. But there is a limit to the city's ability to pay. Is it not true therefore that the plant in order to continue to serve the community, must be willing to adjust its rates to a basis which the people can pay? Would not any other course necessarily end in forcing the city to discontinue a service beyond its means—a result disastrous to all concerned?

Evidently the construction of a plant at all in such a location was a mistake on both sides. Is it not the clear duty of the appraiser in such cases to eliminate on the one hand every possible element of questionable value, and to get his figures down to bed rock, in the hope of finding a way to meet the exigencies of the situation? And on the other hand to see that the city acts in equal good faith—that it properly appreciates the full value of a good supply, and apportions the maximum amount possible to that service. It is worth remembering that in many cases the lowering of private rates to points originally considered suicidal, has so attracted consumers as to materially increase both gross and net income.

Evidently in such unfortunate cases the situation demands a valuation quite apart from the actual physical plus the going values, however just those values may be in the abstract. Fairness to the municipality is not less essential than fairness to the plant. The courts have decided that while such regulations are intended to be mutually fair, they must in any event be fair to the city.

Clearly such reasoning is only effective when the city is prepared for the alternative of abandoning the service. If it is so situated that it cannot do without the service, then it must find a way to pay a fair return for it. But in no event can the value of such service exceed the cost of getting that service in some other way.

Further perplexities are often found. It has been questioned by many fair-minded men whether the plant after all has any ownership of the business on which going value is based. Should the people pay for what they have themselves furnished? Certainly such value can go no further than the actual cost of reproducing that business.

It will be noticed that both the Alvord and Wisconsin methods give the greatest going value to those plants which have had the longest and hardest struggles to build up their business, while such plants are actually worth the least as commercial propositions. Prosperous plants, with large business quickly established, have the least going value, though far more attractive to the investor. The same is true as regards rates. A high schedule usually means low going value, while low rates increase going value.

With such wide divergences of opinion among thoughtful and fair-minded men, it is not strange that much effort has been devoted to the finding of better and simpler methods. Nor is it strange that despairing of success, shorter methods—less logical perhaps, but giving due recognition to the underlying principle—should find favor. Some of these may be noted:

In one of the most important cases of recent years, in the hands of men of great ability, the results of various methods of computation were all found to be reasonably close to one year's gross revenue, and that sum was finally agreed upon.

In the Staten Island case—see paper by Mr. L. L. Tribus, presented at this meeting—the going value was arbitrarily fixed at $10.00 per service.

In Canada a flat addition of 10 per cent is made to the physical value to cover all the intangible values. See Municipal Acts of Ontario, 3 Ed. VII, Chap. 19, Sec. 566. Sub Section 4, clause (a2), which reads:

> In any arbitration under Clause (*a*) hereof to determine the price to be paid for the works and property of a gas or water company, the arbitrators shall determine the actual value of such works and property having regard to what the same would cost if the works should be then constructed or the property then bought, making a due allowance for deterioration and wear and tear, and making all other proper allowances, but not allowing anything for prospective profits or franchise, and shall increase the amount so ascertained by ten per cent thereof, and such increased amount shall be the amount which the arbitrator or arbitrators shall award as the price to be allowed for the said works and property.

In drawing a new contract at Mexico, Mo., the writer recently adopted a somewhat similar idea, as follows:

> *Purchase by City:* The City shall have the right to acquire by purchase all the property of the Grantee actually used and useful for the convenience of the public, at any time after the expiration of fifteen (15) years from the passage and approval of this ordinance by public vote, upon giving one year's notice to the Grantee, and upon paying therefor in cash the then cost of duplication, less depreciation, of said property, with ten per cent (10 per cent.) additional thereto as compensation for earning power, franchise value, going value, contingencies, and all other intangible values of every nature whatsoever.

The author's concluding remarks indicate a preference for using the actual cost of the existing plant—where it can be ascertained—as the basis of fixing rates, rather than the present cost of reproduction less depreciation, because of the exceeding complexity of the computations. It may be questioned whether many appraisers will follow him here. The idea is fundamental that present values and rates must be based on present-day conditions. Nor is it usually difficult for able, experienced and fair-minded appraisers to agree with reasonable closeness on physical values.

When the intangible values are taken up the situation—as has been shown—is far different. Here if anywhere simple and direct methods—appealing more strongly to the average man's ideas of fairness—are needed. And from this standpoint the simple methods used above are not without merit.

The writer finds difficulty in following the author in another matter, that of computing the cost of reproducing the existing plant. The author seems to justify including all worn-out or discarded parts. He states that the computations must be based on the identical plant under consideration, and it must be assumed to encounter all the difficulties which the original plant met with. (Paragraphs 3, 4 and 5 under "Physical Value.")

The reproduction theory assumes that the existing plant in whole or in part is suited to the present-day needs of the community. The value of a service cannot exceed the cost to the city of serving itself, plus a reasonable profit commensurate with the responsibility and risk involved. In so far therefore as the plant as it stands is well adapted to that service it is entitled to a fair return. But worn-out and discarded parts have no part in present performance, and should have been covered by past earnings. They represent no present value, however necessary they may have been earlier. Nor can present values be saddled with errors of judgment resulting in unwise expenditures, unless it is clear that these or similar outlays would accompany the duplication of the plant today. The writer would, as already stated, favor some allowance among "contingencies" to cover such risks of design and construction as unavoidably attend such enterprises.

Nor need the plant to be duplicated be an exact counterpart of the existing plant, except so far as it is adapted to existing conditions. Real estate, buildings, machinery, pipe lines, material and supplies—beyond the present or reasonably early needs of the system—should not be considered. The Wisconsin law covers this admirably in its use of the terms "actually used and useful for the convenience of the public."

Neither is it proper to figure on obsolete and expensive apparatus or material. Antiquated pumping engines which could only be actually duplicated by making new patterns; and masonry for which better and cheaper concrete would now be used, are examples.

CLOSURE BY MR. JOHN W. ALVORD

In closing this discussion the author feels unusually favored that so many able members of the Society have found time and interest enough to present ideas on this subject of going value, and more particularly that so many have recorded their frank variance with some of the ideas set forth. It is clearly through differences of opinion on the part of those who have studied a subject in a spirit of reasonableness that we draw near to the goal of truth toward which we strive.

It is somewhat to be regretted that a considerable proportion of the discussion is broader than the subject of the paper, not but that breadth of discussion is often valuable, but in this case it perhaps tends to lack of clearness. The paper it may be remarked deals only with one item of one of several methods of valuation, viz: the item of going value in the method of reproducing at present cost. Some of the discussion refers to other methods of valuation, and is somewhat confusing because this is not clearly stated.

There are at least three, and perhaps four, well approved methods of valuing a public utility property of the kind in question, all of which are proper under certain circumstances:

1. The method of reproducing its property and business at present cost, lessened by any depreciation the original plant or business has suffered.

2. The method of ascertaining the actual past investment from books of account, in which case neither depreciation or appreciation is usually considered.

3. The method of determining value by the market price of

stocks and bonds, when an active and representative market can be fairly said to exist.

4. The method of valuing from the standpoint of a willing seller to a willing buyer who, as a judicious investor, judges the plant by a careful analysis of its income, privileges, duties, and the future prospects of the city it serves, without going greatly into cumbersome detail.

The paper deals only with the first named method of valuation, and only one item of that method, viz: the reproduction of its business. We should not confuse this method with the determination of going value under any of the other methods, because going value may be found in quite a different manner under other methods of valuation; thus, for instance, the past cost of going value, discussed in the Marinette case by the Wisconsin Public Utility Commission, should be differentiated from the present cost of reproducing going value, just as the past cost of a pump or a set of pipes may be quite different from the cost of their present cost production. It seems to me clear that the past cost of going value can only be properly used in connection with the past cost of the whole plant under consideration as in the second method mentioned. To mix past cost data with the method of reproducing at present prices seems to me to mix two things which are unlike, and which therefore, is a procedure which is illogical and improper. Past cost will, of course, always throw light on present value, but if the estimator is determining the present cost of reproduction, he must logically stick to present reproduction to the end. To abandon his method at some certain stage because it does not suit him, and go to some other method of valuation, is a confession that he either does not understand the proper application of that method, or is not honestly willing to abide by it because the results do not suit him.

Mr. Williams' suggestion that this discussion is properly limited to a public utility is a wise one. This was not made clear at the outset of the paper. Some of the confusion of ideas in the discussion is undoubtedly due to the fact that we are not here discussing the valuing of a competitive business but a virtual monopoly hedged by contractual rights and obligations on both sides.

The writer is unable to follow Mr. Williams' distinction that

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the value of a created income is different from the cost of reproducing a given income. It is possible he might draw this distinction properly under some other circumstances but here we are discussing the values found by discovering the *cost of reproduction* and for the moment are necessarily assuming that the value of a created income will be the cost of its reproduction just as we assume under this method that the value of a pump will be the cost to reproduce it. It may be, after completing our work of reproducing, we shall find that the value of the plant is not found accurately by estimating the cost to reproduce [Mr. Williams himself points this out at the close of his discussion], but is better and more properly found by some other method, say past cost, or investors' analysis, but that cannot affect us in computing going value under the method of reproduction. We are compelled there by the very method we have adopted of assuming for the moment that the value of the created income is the cost of reproducing it, and the paper does not attempt to discuss any other view, although other views have their proper time and place under some other heading, nor do I see the force of his illustration that it is impracticable to consider that a $10,000 annual income might cost $20,000 to start "going." Such a statement does not turn $10,000 of value into $20,000 of value. It seems clear to me that if it cost $20,000 to rehabilitate an annual income of $10,000 that the value of that income in connection with the physical plant is $20,000, when computed for a public utility *under the method of cost to reproduce.* This difference of opinion therefore seems to me to be only due to extending the discussion beyond the scope of the paper, and considering the definition of going value as applying to values obtained by means other than those derived from the method of reproduction.

Mr. Williams is nevertheless an exceptionally clear thinker on this subject, and his analysis of the method of computing going value and the resulting debits and credits is worth careful study, and is a valuable contribution to the discussion.

Both Mr. Bryan and Mr. Kiersted seem to think that the hazards of the water works business should enter into the computation of going value. I can hardly bring myself to agree with this. It seems to me that that is a subject to be separately considered after the cost of reproduction has been ascertained,